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THE IMPACT OF TAX LIMITATION ON THE UTAH ECONOMY

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Important issues facing Utahns in this election year are the three tax-reduction initiatives on the November ballot.

The purpose of this article is to discuss some of the economic questions raised concerning these tax reduction initiatives. Specifically, five issues are considered: What is the fiscal impact of the initiatives? Where will the cuts be taken? Will the tax cuts help or hurt Utah's economy? Were Utah's current economic problems created by high taxes? It worked in California and Massachusetts, can it work here?

1. What Is the Impact

Most analysts now agree that Initiative A will reduce property tax collections by between \$140 and \$185 million, although there is some continuing disagreement. This is a state-wide reduction of total property tax revenue of between 19 and 25 percent.[1] The impact of Initiative B which provides for reductions in income, sales, cigarette, and fuel taxes is estimated to cut revenues by \$141 million. Initiative C, a tax credit for students in private schools, reduces state funds by \$4 million. Combined, the state-wide impact is about \$330 million.

The total general tax revenue for Utah for 1986 was \$2.1 billion. This figure is derived by subtracting federal grants, insurance trust fund and debt payments, and dedicated credits (such as fees), from the U.S. Department Commerce total revenue figure of \$5.1 billion. These excluded sectors are not affected by the initiatives. Therefore, simple division of the \$330 million proposed initiatives reductions by the \$2.1 billion state and local tax revenue shows the impact to be 15.7 percent.

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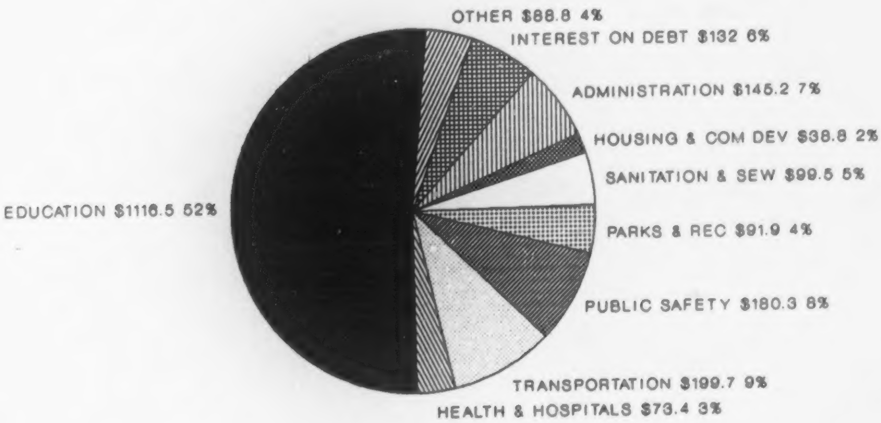
2. Who Takes the Cuts

Since the Utah Constitution requires balanced budgets, reductions in revenues mean that the expenditures must likewise be cut. It should come as no surprise that the biggest loser in the tax rollbacks will be education. Public education accounts for about 54 percent of property tax revenues and public and higher education take about 66 percent of the state's General Fund/Uniform School Fund budget. Of the $330 million tax reduction, $153 million will come from public and higher education if the cuts are taken across the board; or in other words, 46.5 percent of the total cut will be borne by education.

Though there could be some shifting in the cuts, public and higher education are simply too large a share of state and local taxes to be immune to the reductions. As Figure 1 shows, education absorbed 52 percent of local government expenditures in fiscal year 1985-86. No other category accounted for even 10 percent. For example, public safety, health and transportation combined only absorb 20 percent. Administration, often cited as the place to cut, takes only 7 percent of local government budgets. At the state level, 82.6 percent of the General Fund/Uniform School Fund budget goes to public education, higher education, social services, health, and corrections, Figure 2. The rest of the state government operations would have to be virtually eliminated in order to protect these key agencies.

Figure 1

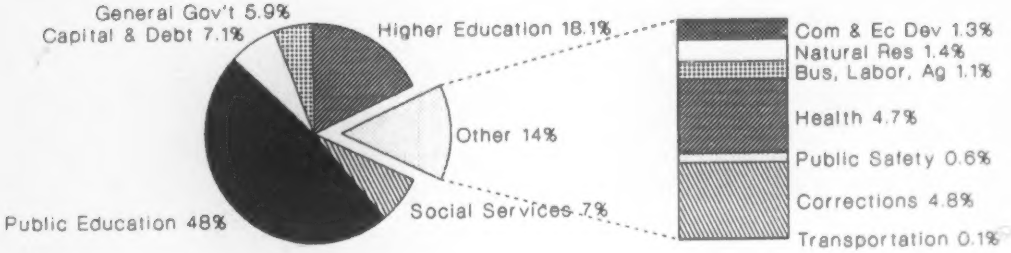
General Expenditures of Local Governments in Utah by Function: 1985-86 (in millions)



SOURCE: U.S. BUREAU OF THE CENSUS

Figure 2

Appropriated Expenditures: FY 1988-89
General Fund and Uniform School Fund



Source: Ut Office of Planning and Budget

3. The Key Question: Will the Tax Cuts Help or Hurt Utah's Economy?

The Short Term Impacts

It appears that the key question surrounding the initiatives is, "Will the tax cuts help or hurt Utah's economy?" Proponents of the initiatives claim that "prosperity follows tax cuts". They argue that reducing taxes will increase consumer spending and thus create economic growth with an alleged multiplier effect of three to four times the dollars spent by consumers.

For small states like Utah where most consumer goods come from outside the state, this argument is simply inaccurate. Tax cuts in the national economy have very different economic effects. First, the Federal government can engage in deficit spending, and hence there may be no reduction in government spending; and second, consumers' increased spending will be for goods and services mostly produced in the national economy. Hence such tax cuts can have a multiplier effect. Utah's income is simply redistributed between the public and the private sectors. The total amount of economic activity is not increased so the multiplier analysis is inappropriate.

If taxes are reduced, people will have more money to spend on consumption of goods and services, but government will have less. Personal consumption and government spending are both components of total economic activity. In the case of tax cuts in Utah, total economic activity will most likely be reduced and any multiplier is most likely to be negative.

Consumer spending for food, clothing, automobiles and other durables, or for mortgage payments leaves the state spending stream very rapidly. Economists often refer to this activity as the first round, because the money flows to suppliers outside the state.

Spending on government services has a different economic impact. First, spending on roads, education, law enforcement, and health represents to a considerable extent, investments in the future productive capacity of the Utah economy and are not current consumption items. Second, the spending on these items occurs almost entirely within the Utah economy, with only a small proportion coming from outside suppliers. Hence, spending in the public sectors leaks out of the spending stream at a much slower rate, and only after the second round of spending where households spend their government payrolls for consumption items. This is why one economist remarked that tax cuts in Utah will bring prosperity in Detroit, Japan, and California, but not in Utah.

There has been major research done in this area. In a 1985 study entitled, "The Interindustry Effects of Tax and Expenditure Limitations, The California Case," by Vinod Agarwal and W. Douglas Morgan, input-output analysis was used to analyze the interindustry effects of tax and expenditure limitations in order to estimate the total impact of the limitations on California. To quote from the study:

> In general the impact effect of a tax reduction raises one sector's income and expenditures--households and business--and reduces the incomes and expenditure of the other sector--local government. Such a shift in expenditure patterns and levels has differential effects on the final output (for example, more TV sales and fewer road repairs) and this affects the distribution and levels of income in a regional economy. Those industries and business which experience an increase in demand as households spend more tend to gain, while those industries and business whose demand is reduced as governments spend less will lose.[2]

Morgan and Agarwal found that in the case of a tax reduction of $2.89 billion, followed by a government expenditure decrease of the same amount, an increase of $2.56 billion in household spending would result. This eventually created a negative change in gross output of $4.3 billion after all indirect and multiplier effects were included. The point is Proposition 13 actually hurt the California economy, because more of the tax cut leaked out of the economy than would have if it had been spent by the public sector.

Long Term Impacts

What about long term aspects of "prosperity" following the tax initiatives? The tax limitation coalition argues that the initiatives will create more jobs in the future because more companies would want to locate in Utah if taxes were lower. This point cannot be proven. Taxes are a cost of doing business and if that cost is lowered then business benefits. However, business also receives other benefits from taxation, such as trained workers and better roads. The question is how important are taxes to business?

The firm of Grant Thornton, Accountants and Management Consultants, produces an annual report using 21 indicators to determine a state's overall manufacturing climate.[3] Each of these factors receives a weighted percentage with all 21 factors adding to 100 percent. Taxes receive a weighting of 4.44 percent, 13th highest among the 21 factors. Several other state and local government fiscal policies also affect the overall rating, including changes in taxes and expenditure growth vs. personal income growth. The total of these three make up about 14 percent of the overall manufacturing climate. Grant Thornton believes that there are nine factors more important than taxes or any state and local fiscal policies to manufacturing businesses who might locate in Utah, including education, wages, available work force, unionization, etc.

In 1987, the Grant Thornton study based on these 21 factors, gave Utah a score of 42.3, 33rd among the 50 states. Would lowering taxes change our manufacturing climate significantly, according to Grant Thornton? If we were to reduce taxes by 12 percent (the original estimate of tax reduction in Utah due to the proposed initiatives) the Grant Thornton score of the manufacturing climate would change only slightly more than four percentage points from 42.3 to 46.7 and Utah would rank 28th among the 50 states. This assumes all other rankings would remain unchanged. They would not. The impact of lowering taxes would reduce other factors included in the ranking which are important to attracting manufacturing industries such as investment in education and transportation. Declines in these factors may in fact offset any gains made by lowering taxes.

One could argue about the validity of the Grant Thornton Study and the particular weight placed on any of the criteria. The point is taxes are only a small part of doing business. There are many factors besides taxes which are very important to manufacturing and other industries. Other studies have been done to support this conclusion. To quote from one such study published in the Multistate Tax Commission Review:

> The staff first reviewed over 30 years of research on the factors that influence where a business locates. This body of learning suggests that locational decisions are extremely complex and that state business taxes are just one of the innumerable factors that vary among jurisdictions. The majority of studies conclude that state and local taxes do not significantly influence most business locational decisions.[4]

Perhaps another way of examining the long term prospects for prosperity is by examining other "prosperous" states. During the 1980's the 12 states having the highest rates of employment growth were: Florida, Nevada, Arizona, Alaska, Hawaii, New Hampshire, Georgia, South Carolina, Texas, Delaware, New Mexico and Utah respectively.[5] If taxes have a large impact on growth then one would expect these states to have lower state and local taxes. A look at fiscal year 1986 figures is revealing. New Hampshire, Florida, Texas and Georgia have lower state and local taxes per $1,000 of personal income, ranking 50th, 47th, 43th, and 35th respectively. However, Alaska, Hawaii, Utah, Arizona, Delaware and New Mexico have higher taxes--ranking 1st, 5th, 7th, 11th, 13th and 16th, respectively. Therefore in four cases, there appears to be a relationship between growth and lower taxes; while in six cases there appears to be a relationship between growth and higher taxes, Utah included. It is clear that the tax initiatives, by themselves, will not create economic prosperity.

In discussing high and low tax states it should be mentioned the variation among states is not significant. Forty-two of the fifty states have total state and local taxes which range from 10-12 percent of personal income. All but four states range from 9-13 percent. (Utah is at 12.5 percent.) On the low end is New Hampshire with 8.4 percent and on the high end is New York at 15.8 percent.[6] Wyoming and Alaska are extreme exceptions with 19.8 percent and 25.3 percent.

With tax rates which do not differ greatly, these rates simply cannot have a significant influence on the overall growth of a state or on business locational decisions.

Why is it then that some states are prospering while others are not? According to Inc. Magazine's recently released "Annual Report of the States," eight of their top 10-ranked states look out upon an ocean. The other two top ten states, Arizona and Nevada, are landlocked. However, these two states must give much credit to the coastal state of California and its growing economy for their prosperity. To quote from the study:

> This year's survey tells the tale of two economies. The one that is flourishing has top universities, a strong technology base--and an ocean view. One is prosperous, while the other is still in the throes of a deep recession. One boasts of fine universities and information-intensive businesses, while the other mourns the loss of farms, factories and oil rigs....
>
> The coastal states are not simply rising on the tide, their economic growth has strong underpinnings: decades-long transition from heavy industry to service businesses, and a reliance on the commercialization of technology developed at top research universities....
>
> The future doesn't look nearly as bright for states still dependent on oil, agriculture, and heavy industry. The latest to take a hard fall in the ranking is Alaska. After weighing in at #2 last year, its ranking fell further than the mercury on a Juneau night. This year it tumbled into the 39th slot.[7]

This study would suggest that taxes have nothing to do with the flourishing economies of states. Many of the top states are high tax states. What is driving the superior economic performance of these states is their location, their industrial mix and their commitment to excellence in education.

It must be kept in mind that government is important to business. In today's complicated international economy, government plays a vital role in economic development. For example, a national study conducted by the Federal Reserve Bank of Cleveland found a strong statistical link between the building of such things as roads, water systems and sewer systems by state and local government and local economic development.[8] Likewise, another national study conducted by Syracuse University found a positive correlation between economic development and education expenditures[9]. The tax reduction initiatives will seriously reduce funding for both education and infrastructure which are so important to economic development.

4. Were Utah's Current Economic Problems Created by High Taxes?

Utah's economic problems in the 1980's are not a result of high taxes, but instead the result of job losses in the goods-producing industries. These job losses occurred because of falling oil prices, severe international competition and the completion of major construction projects like the Intermountain Power Project.

As many people are well aware, the 1980's have meant lower economic growth for Utah. Annual average employment growth in the 1980's has been slower than for any decade since the 1930's. Furthermore, average annual wages when adjusted for inflation, have decreased.

To fully understand Utah's economic slowdown, one must examine the goods-producing industries; namely, mining, manufacturing and construction. Goods-producing jobs numbered 137,750 in 1980 and had fallen to 127,200 in 1987--a drop from 25 percent of Utah's total nonagricultural employment to 20 percent. Fortunately, the services-producing sector showed a gain of almost 100,000 jobs during that same period.[10]

Since 1981, Utah's mining industry has sustained two severe blows. First, the temporary demise of the copper industry in Utah meant the loss of thousands of jobs. Second, lower oil prices precipitated the employment declines in the energy industries (coal, oil, and uranium). Between 1984 and 1985, mining jobs were reduced by one-fourth, or about 3,000 jobs. The same pattern followed the next year, mining positions dropped by nearly one-fifth.[11] From 1981 to 1987 mining employment has fallen from 20,300 to 8,000.

The several activities comprising Utah's manufacturing industry experienced widely varying employment changes from 1981 to 1987. The extremes were primary metals, which lost 5,400 jobs, and transportation equipment, which gained 6,300 jobs. The net effect was that, after peaking at 89,300 jobs in 1981, the industry declined to a low of 85,500 in 1983. It then surged forward to 1985's 94,000, but slipped back to 92,100 jobs in 1986. Although not reflected in the modest 1987 annual average of 92,500 jobs, with the revival of primary metals and the continuing growth of most other sectors, manufacturing ended 1987 with its highest ever job count--96,300. Nevertheless, manufacturing has not experienced the growth in the eighties that it did in the seventies, 4.8 percent annual growth to .8 percent annual growth respectively.[12]

Utah's construction industry has experienced a boom and a bust during the past few years. The boom, which added 8,600 jobs, occurred from 1983 through 1985. The bust, from 1985 through 1988, has lost over 12,000 jobs. Over half (4,500) of the 1983 to 1985 job increase was construction jobs on the Intermountain Power Project. The completion of the Intermountain Power Project in 1986, coupled with a general slowdown in construction activity, resulted in a 9.3 percent decline in construction employment in Utah. In 1987 construction employment dropped even further--17 percent, over 5,500 jobs. In fact construction was the only major industrial sector to actually sustain a net job loss during 1987.[13]

None of these major occurrences--the IPP phasedown, oil price declines, copper and steel shutdowns--had anything to do with the level of state and local taxes. Instead many of these occurrences were affected by national and international forces beyond the control of Utahns. Reducing taxes will not bring back the oil industry nor stimulate new power plant development.

Utah's Economic Growth Since the 1987 Tax Increase

If one argues that prosperity follows tax cuts, how do we explain the significant economic growth in Utah since the tax increase of 1987? Employment growth has picked up considerably since the tax increase was implemented. The growth in total wages (measured as the percent change from previous year) has averaged 4.7 percent over the last four quarters, (second quarter 1987-first quarter 1988.) In the eight quarters before the tax increase, employment growth averaged 3.9 percent.[14]

5. It Worked in California and Massachusetts, Why Not in Utah?

The Tax Limitation Coalition has argued that tax limitation has been successful in both California and Massachusetts, so why shouldn't it be successful in Utah? There are at least two reasons why the limitations may not be a success.

First, the situations were very different in those states than what exists today in Utah. Effective property tax rates before the propositions were 5.5 percent and 3 percent in California and Massachusetts, respectively. After tax limitation propositions were implemented in California and Massachusetts, the effective property tax rates fell to .64 percent and 1.35 percent respectively. The average effective property tax rate in 1986 in Utah was 1.1 percent.

Also at the time tax limitation efforts were passed in California, they were undergoing substantial economic growth. Total personal income in California grew by 88 percent during the period 1975-1980. The state government budget was likewise growing significantly. They had a reported $4 billion budget surplus at that time. Much of this surplus was used to offset the impact of tax limitation on local governments. Utah does not have that level of budget surplus.

Secondly, what is proposed in Utah goes way beyond tax limitation in either California or Massachusetts. Proposition 13 in California limited property taxes to 1 percent of the value of the property. Proposition 2-1/2 in Massachusetts placed a limit of 2-1/2 percent of market value on property taxes. The tax limitation efforts in Utah would place a limit on property taxes that could not exceed 3/4 of 1 percent of fair market value of residential property and 1 percent of the market value of property other than residential. In addition, the proposal rolls back the sales, motor fuel, cigarette and income taxes. Moreover, the proposals would limit the growth in all taxes at both the state and local level in the future. Therefore, the tax limitation initiatives in Utah are far more sweeping than those passed elsewhere. One must question the wisdom of putting such severe constraints on state and local government without sufficient evidence that Utah spending on government services is out of line with other states.

Summary

In summary, what can be said of the five issues that have been raised in this article? First, the fiscal impact of the initiatives translates to a cut of general tax revenues of around 15.7 percent.

Second, should the proposed initiatives be adopted it is clear that public and higher education will receive a substantial portion of the cuts. If all cuts were to be taken across the board over 46 percent of the cuts would apply to education. If education is protected, then the other services of government would virtually have to take cuts of twice the size they would otherwise take.

Third, there is virtually no statistically verifiable evidence that tax cuts bring prosperity by themselves. On the contrary there is evidence that the cuts could hurt the economy when essential services are reduced significantly.

Fourth, Utah's economic slowdown in the 1980's has nothing to do with Utah tax rates. Rather it is a result of a downturn in Utah's goods-producing industries because of international and national economic forces.

And last, Utah's tax initiatives cannot fairly be compared to those of California or Massachusetts because of Utah's unique demographics and because the proposed initiatives go much farther and recommend cuts that are much deeper.

Endnotes

[1] The Office of the Legislative Fiscal Analyst has estimated the impact to be $140 million. The difference between the Tax Commission's $185 million and the $140 million lies in the way each agency counted debt which is excluded from the tax limitation initiatives. Deseret News. Minutes from the ACIR meeting, Salt Lake City, Utah, August 26, 1988. Utah Foundation, October 1988.

[2] Vinod Agarwal and W. Douglas Morgan, "The Interindustry Effects of Tax and Expenditure Limitations", Growth and Change, 16 (April 1985):3.

[3] Grant Thornton, Accountants and Management Consultants, The Eighth Annual Study of General Manufacturing Climates of the Forty-eight Contiguous States of America (June 1987).

[4] Richard D. Pomp, "A New York Perspective on Tax Incentives", Multistate Tax Commission Review, 1985 (August 1985):1.

[5] State Policy Databook, 1988, State Policy Research, Inc.

[6] State Policy Databook.

[7] Joshua Hyatt, "Coast to Coast--Inc.'s Annual Report on the States", Inc. Magazine, October 1987.

[8] Douglas Dalenberg and Randall W. Eberts, "Public Infrastructure and Economic Development", Federal Reserve Bank of Cleveland, January 15, 1988.

[9] Michael Wasylenko and Therese McGuire, "Jobs and Taxes: The Effects of Business Climate on States' Employment Growth Rates", National Tax Journal, 38:497-505.

[10] Economic Report to the Governor, 1988, State Economic Coordinating Committee.

[11] Economic Report to the Governor, 1988.

[12] Economic Report to the Governor, 1988.

[13] Economic Report to the Governor, 1988.

[14] Utah Labor Market Report, Vol. III, Utah Department of Employment Security, July 1988.

Utah Business Statistics

UTAH DATA	June 1987	June 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	18,815	NA	NA	NA	18,496.5	NA
New Corporations (no.)	507	462	-8.9%	472	453	4.2%
New Car, Truck and Motorhome Sales (no.)	5,482	5,310	-3.1%	5,252	5,549	-19.1%
Agriculture						
Average Prices recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	66.50	67.30	1.2%	66.03	60.03	10.0%
Lambs (cwt)	76.80	58.10	-24.3%	69.73	70.10	-0.5%
Milk Wholesale (cwt)	11.40	10.50	-7.9%	11.64	12.01	-3.1%
Alfalfa Hay, Baled (per ton)	69.00	75.00	8.7%	72.00	64.25	12.1%
Cattle Slaughtered (live weight) (thous. of lbs.)	39,501	46,514	17.8%	45,153	39,261	15.0%
Construction						
Total Construction (thous. of dol.) 1	211,401	199,466	-5.6%	122,503	123,300	-0.6%
Residential	68,075	53,355	-21.6%	48,658	56,778	-14.3%
Nonresidential	56,391	102,429	81.6%	44,336	40,479	9.5%
Public Works and Utilities	86,935	43,682	-49.8%	29,546	26,043	13.4%
Total Permit Construction (thous. of dol.) 2	95,014.8	103,675.8	9.1%	79,186.1	101,190.7	-21.7%
Residential	50,311.4	50,129.0	-0.4%	35,635.6	52,560.4	-32.2%
Nonresidential	27,991.5	36,071.1	28.9%	29,559.8	35,322.3	-16.3%
Additions, Alterations and Repairs	16,711.9	17,475.1	4.6%	13,991.6	13,305.0	5.2%
New Dwelling Units (no.)	727	712	-2.1%	498	857	-41.9%
Employment						
Civilian Labor Force (thous.)	767.7	750.8	-2.2%	756.2	758.3	-0.3%
Total Employed Persons	717.8	715.2	-0.4%	713.3	710.3	0.4%
Unemployed Persons	50.0	35.6	-28.8%	42.9	48.0	-10.6%
Percent Total Labor Force	6.5	4.7	-27.7%	5.7	6.4	-10.6%
Employees on Nonagricultural Payrolls (thous. of jobs)	642.8	657.2	2.2%	645.7	636.4	1.5%
Manufacturing	92.3	97.0	5.1%	94.8	90.9	4.4%
Mining	8.1	8.5	4.9%	8.2	7.6	7.8%
Contract Construction	28.2	25.8	-8.5%	25.1	29.6	-15.0%
Transportaion, Communication and Utilities	37.6	39.1	4.0%	38.3	37.5	2.1%
Wholesale Trade	34.8	34.1	-2.0%	35.2	35.5	-0.9%
Retail Trade	117.9	118.8	0.8%	118.3	117.8	0.5%
Finance, Insurance and Real Estate	33.9	33.9	0.0%	33.7	33.4	1.0%
Services 3	143.2	156.1	9.0%	150.5	141.9	6.0%
Federal Government	40.0	39.3	-1.8%	39.5	40.3	-2.1%
State Government 4	37.6	37.7	0.3%	37.5	38.0	-1.4%
Local Government 4	65.4	66.3	1.4%	64.5	63.6	1.4%
Average Weekly Hours						
Manufacturing	39.8	41.0	3.0%	40.5	39.5	2.4%
Mining	40.0	41.7	4.3%	42.4	41.1	3.0%
Wholesale Trade	38.8	38.9	0.3%	38.4	37.4	2.6%
Retail Trade	28.8	28.4	-1.4%	28.2	28.1	0.3%
Amount of Unemployment Compensation (thous. of dol.)	7,375.1	4,962.0	-32.7%	6,434.2	8,809.8	-27.0%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,476.5	2,441.0	-1.4%	2,371.4	2,425.7	-2.2%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	156,747.8	178,968.1	14.2%	148,808.3	129,531.1	14.9%
Sales and Use Tax	62,358.9	69,967.4	12.2%	51,245.0	46,542.8	10.1%
Motor Fuel Tax	14,960.3	20,988.8	40.3%	10,779.9	8,331.8	29.4%
Individual Income Tax	33,916.5	46,245.8	36.4%	53,137.5	44,421.1	19.6%
Corporation Franchise Tax	11,481.2	11,819.5	2.9%	5,971.8	5,073.9	17.7%
Production						
Net Electric Power Utilized (mil. of kwh)	1,135.0	NA	NA	NA	1,112.6	NA
Crude Oil to Refineries (thous. of bbls.)	3,804.9	4,425.0	16.3%	3,926.2	3,918.3	0.2%
Crude Oil (thous. of bbls.)	2,896.1	2,739.6	-5.4%	2,894.8	3,045.3	-4.9%
Natural Gas (mil. of cu. ft.)	19,950.6	22,572.9	13.1%	23,177.9	20,176.0	14.9%
Coal (thous. short tons)	1,187.0	1,514.0	27.5%	1,522.6	924.6	64.7%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	913,902	948,592	3.8%	853,457	833,420	2.4%
Highway Traffic Count Across State Lines	48,264	NA	NA	NA	38,146	NA
Transient Room Taxes (thous. of dol.)	582.5	716.6	23.0%	532.6	437.2	21.8%
Visits, State, Nat'l. Parks, Monuments (thous.)	1,977.6	1,966.3	-0.6%	1,067.2	1,031.1	3.5%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	477,221	485,999	1.8%	484,174	476,240	1.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	175,281	180,630	3.1%	178,340	172,214	3.6%
Electric Customers (Residential)	467,881	NA	NA	NA	467,341	NA
Electric Customers (Commercial)	46,273	NA	NA	NA	45,912	NA
Natural Gas Customers (Residential & Commercial)	443,654	456,898	3.0%	452,742	441,393	2.6%
Natural Gas Customers (Industrial)	556	544	-2.2%	548	563	-2.5%

Utah Business Statistics

UTAH DATA	June 1987	June 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	53.1r	53.3fo	0.4%	52.3	52.7	-0.8%
Unemployment Rate	5.7r	4.3	-24.6%	4.9	5.2	-5.6%
Auth. Permit Construction (thous. of dol.)	12,728.7	12,139.4	-4.6%	10,052.4	15,104.1	-33.4%
New Dwelling Units (no.)	120	94	-21.7%	75	141	-46.5%
Postal Receipts (thous. of dol.)	347.4	315.8	-9.1%	373.1	NA	NA
Electric Customers (Residential)	47,121	47,858	1.6%	47,792	46,365	3.1%
Electric Customers (Commercial)	3,271	3,441	5.2%	3,344	3,265	2.4%
Natural Gas Customers (Residential)	48,677	50,609	4.0%	49,583	47,736	3.9%
Natural Gas Customers (Industrial)	52	52	0.0%	52	52	0.5%
Telephone Lines in Service (Mt. Bell)(Residential)	54,959	55,232	0.5%	54,981	54,155	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,575	11,358	7.4%	10,928	10,321	5.9%
Salt Lake County						
Non-Ag. Employment (thous.)	334.3r	340.0fo	1.7%	335.9	332.0	1.2%
Unemployment Rate	5.7r	4.4	-22.8%	5.1	5.5	-6.0%
Auth. Permit Construction (thous. of dol.)	43,610.0	40,128.6	-8.0%	36,027.0	48,835.5	-26.2%
New Dwelling Units (no.)	274	259	-5.5%	179.8	374.4	-52.0%
Postal Receipts (thous. of dol.)	6,786.3	7,583.0	11.7%	7,620.7	7,056.1	8.0%
Electric Customers (Residential)	234,279	NA	NA	NA	234,064.3	NA
Electric Customers (Commercial)	19,792	NA	NA	NA	19,640.8	NA
Natural Gas Customers (Residential)	216,415	220,007	1.7%	218,805	215,413	1.6%
Natural Gas Customers (Industrial)	241	235	-2.5%	235	249	-5.8%
Telephone Lines in Service (Mt. Bell)(Residential)	226,229	229,612	1.5%	228,559	224,943	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	109,682	111,113	1.3%	110,370	108,950	1.3%
Utah County						
Non-Ag. Employment (thous.)	72.8r	75.4fo	3.6%	74.5	72.6	2.6%
Unemployment Rate	7.1r	4.1	-42.3%	5.4	7.3	-25.5%
Auth. Permit Construction (thous. of dol.)	13,321.5	19,406.8	45.7%	11,169.8	11,185.9	-0.1%
New Dwelling Units (no.)	96	110	14.6%	69	102	-31.9%
Postal Receipts (thous. of dol.)	903.0	1,150.3	27.4%	1,010.1	927.8	8.9%
Electric Customers (Residential)	50,225	52,168	3.9%	52,865	50,247	5.2%
Electric Customers (Commercial)	6,587	5,981	-9.2%	6,025	6,330	-4.8%
Natural Gas Customers (Residential)	59,591	61,092	2.5%	60,993	59,996	1.7%
Natural Gas Customers (Industrial)	68	65	-4.4%	68	70	-2.0%
Telephone Lines in Service (Mt. Bell)(Residential)	61,134	63,645	4.1%	63,629	62,300	2.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	18,459	19,690	6.7%	19,418	17,287	12.3%
Weber County						
Non-Ag. Employment (thous.)	60.5r	60.8fo	0.5%	60.9	60.3	1.0%
Unemployment Rate	7.8r	5.3	-32.1%	6.5	6.9	-5.7%
Auth. Permit Construction (thous. of dol.)	9,470.0	10,053.3	6.2%	7,468.7	9,319.5	-19.9%
New Dwelling Units (no.)	69	69	0.0%	58	73	-20.7%
Postal Receipts (thous. of dol.)	605.1	591.3	-2.3%	629.4	625.0	0.7%
Electric Customers (Residential)	52,615	53,337	1.4%	53,220	52,392	1.6%
Electric Customers (Commercial)	4,840	4,932	1.9%	4,897	4,788	2.3%
Natural Gas Customers (Residential)	48,582	49,698	2.3%	49,335	48,640	1.4%
Natural Gas Customers (Industrial)	86	82	-4.7%	84	86	-1.7%
Telephone Lines in Service (Mt. Bell)(Residential)	45,935	46,476	1.2%	46,161	45,675	1.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,999	11,970	8.8%	11,438	10,713	6.8%

r Revised fo Forecast Na Not Available

Sources:

Personal Income:	Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations:	Utah Secretary of State.
New Car and Truck Sales:	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture:	U.S. Department of Agriculture, Agriculture, Utah: Utah Crop and Livestock Reporting Service.
Construction Data:	F.W. Dodge Statistics and Utah Construction Report, Bureau of Economic and Business Research.
Employment Data:	Utah Department of Employment Security.
Savings Information:	Utah Savings and Loan Institutions.
Tax Collections:	Utah State Tax Commission.
Net Electric Power Utilized:	Cooperating Utah power companies
Crude Oil Production:	Area oil refineries.
Natural Gas Production:	Utah Department of Oil, Gas, and Mining.
Coal Production:	U.S. Department of Energy.
Air Passengers:	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count:	Utah Department of Transportation.
Visits to State and National Parks and Monuments:	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data:	Cooperating Utah utility companies.
Postal Receipts:	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Footnotes:

1 Obtained from F.W. Dodge Statistics.

2 Obtained from Utah Construction Report.

3 Includes services by nonprofit and religious organizations.

4 Includes public schools and college institutions.

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NATIONAL DATA	June 1987	June 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,484.2	4,819.7	7.5%	4,693.8	4,362.3	7.6%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,747.1	4,046.0	8.0%	3,928.6	3,639.6	7.9%
Industrial Production Indexes (seasonally adjusted) (1977=100)	129.1	136.6	5.8%	133.7	126.5	5.7%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	377.6	429.0	13.6%	412.3	378.3	9.0%
Index of Leading Indicators (1967=100)	190.5	193.7	1.7%	191.5	184.7	3.7%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	113.5	118.0	4.0%	115.8	111.2	4.1%
CPI-U (All Urban Consumers) Food & Beverages	113.8	117.6	3.3%	115.3	111.5	3.4%
CPI-U (All Urban Consumers) Housing	114.3	118.6	3.8%	116.3	112.3	3.5%
CPI-U (All Urban Consumers) Transportation	105.4	108.5	2.9%	107.1	102.4	4.6%
CPI-U (All Urban Consumers) Medical Care	130.0	138.2	6.3%	134.3	126.3	6.3%
CPI-U (All Urban Consumers) Energy	90.7	91.0	0.3%	89.3	85.4	4.5%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	105.5	107.9	2.3%	106.4	103.9	2.4%
GNP Price Deflator (1982=100) (qtly.)	117.3	120.9	3.1%	119.4	115.8	3.1%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	119.5	121.4	1.6%	120.7	118.8	1.6%
Total Civilian Employment (mil.)	112.2	115.0	2.5%	113.8	110.9	2.6%
Unemployment Rate	6.1	5.3	-13.1%	5.8	6.7	-13.8%
Construction						
Total Construction (mil. of dol.)	24,712.0	25,461.3	3.0%	20,790.5	20,222.5	2.8%
Residential	10,986.4	11,888.5	8.2%	9,759.1	9,851.3	-0.9%
Nonresidential	8,227.2	8,566.9	4.1%	7,186.9	6,778.3	6.0%
Non-Building	5,498.4	5,005.9	-9.0%	3,842.8	3,592.8	7.0%
New Dwelling Units (no.)	143,985	144,118	0.1%	122,518	136,300	-10.1%
Interest Rates						
Short Term (3-month Treasury bill rate)	5.69	6.50	14.2%	6.01	5.54	8.5%
Long Term (30-year Treasury bond yields)	8.63	9.04	4.8%	8.74	7.99	9.4%
Prime Rates Charged by Banks on Short-term Business Loans (ave.)	8.25	9.00	9.1%	8.66	7.73	12.1%
Mortgage Rates (new homes)	9.05	8.72	-3.6%	8.83	9.29	-4.9%

Sources: Business Conditions Digest, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant and Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer price Indexes, Producer Price Index.

Chase N. Peterson, *President, University of Utah*
John Seybolt, *Dean, Graduate School of Business*

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WORDPERFECT CORPORATION*

Jan Elise Crispin-Little, Research Analyst

Overview

Located in Orem, Utah, WordPerfect Corporation (WPCorp) is the fourth largest independent personal computer software company in the United States. Founded in 1979 by Alan Ashton and Bruce Bastian, WPCorp is the leading producer of word processing software for the IBM PC and IBM PC compatible market. With over $100 million in sales, the company currently has an estimated 30 percent of this market.

Registered as a Chapter S Corporation, WPCorp has three shareholders -- Alan Ashton, President; Bruce Bastian, Chairman of the Board; and W. E. Peterson, Executive Vice President. Ashton and Bastian each own 49.9 percent of the company. Peterson has a minority shareholder interest of 0.2 percent.

The company's first product was a word processing program developed by Bastian and Ashton for a Data General minicomputer. Since then, the company has expanded its product line to include word processing, spreadsheet, desktop utility and database management applications. These programs are compatible with a broad range of computer systems.

Annual revenues have more than doubled each year since 1982. Sales in 1987 reached $100.3 million and, based on year-to-date figures for 1988, could double by the end of the year.

Employment growth has been equally notable. In 1982, WPCorp employed 16 people; but by the end of 1987, employment had grown to more than 600 people. Within the first eleven months of 1988 over 500 employees were added. Given the company's dramatic growth in sales, employment may reach 1,200 people by the end of the year. About one-third of WPCorp's employees work in the company's Customer Support Division and respond to customer questions or complaints free of charge.

At the retail level, about 40 percent of WPCorp's customers are large corporations. Smaller organizations account for about 25 percent of retail sales and the remaining 35 percent represent purchases by households. Although the company is diversifying its product line, word processing continues to be the mainstay product.

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*This is the first in a series of case studies on Utah's successful high technology companies. It is part of a broad study of Utah's high technology sector. Funding for the study has been provided by the Centers of Excellence Program, Utah Technology Finance Corporation and the University of Utah.

By the end of 1988, four buildings of the new corporate headquarters will be finished. Two more buildings are scheduled for 1989. The new office complex is located in the Orem Timpanogos Research and Technology Park and will provide a central location for the company's 25 divisions, presently spread throughout the city. Expansion activities and capital acquisitions are funded entirely by operations.

WPCorp's word processing program is sold in 18 countries; foreign translation of software and the accompanying manual is available in 14 languages. International sales, primarily to European countries, currently account for approximately 20 percent of total revenues.

WPCorp has essentially "grown up" with the industry as did many successful software development companies. Prior to IBM's announcement of the IBM personal computer (PC), word processing was limited to the mainframe environment. With the advent of the IBM PC, the entire computer industry went through a revolution. Rather than designing applications software for a growing number of proprietary computer systems, the IBM PC set a standard for which applications companies could design software. Much of WPCorp's success is the result of this explosion in the PC market. However, that is only part of the story. Many other factors played an important role in the company's success and these are discussed in this article.

Early History

The impetus behind the WPCorp empire began in 1977 with Alan Ashton, a computer science professor at Brigham Young University (BYU). Ashton had conceptualized a simple, yet effective word processing program that was a significant departure from the Wang standard, the most commonly used word processing system on the market at the time. Ashton's program included innovative features such as modeless editing, automatic insert, and a clean screen showing only formatted text that matched exactly what was printed. Although Ashton had conceptualized this new system, he needed to find someone with special programming skills to develop the product.

Bruce Bastian was the band leader and a graduate student at BYU in 1978 working toward a Master's degree in Computer Science. His combined interest in music and computers resulted in an ingenious thesis project. By "tying" three computers together, Bastian designed a computerized marching band in three-dimensional graphics. His creative programming ability caught Ashton's interest, and in 1979 a partnership between the two was formed.

They called the new company Satellite Software International (referred to throughout this article as WPCorp) and located in Orem, Utah. While both had the vision for this revolutionary product, they lacked the financial resources for actual development. Another person, Don Owens, was invited to join the new company. In return for a full partnership position, Owens agreed to secure start-up capital and then later assume responsibility for sales and marketing. Unfortunately, these financial arrangements did not materialize and without a tangible product, the newly-formed partnership dissolved within a few months.

Undaunted, the original founders looked for another way to realize their dream. Within a short time, the ideal opportunity materialized. The city of Orem had purchased a used Data General minicomputer from another Orem-based company, Eyring Research Institute. As a stipulation of the sale, Eyring agreed to provide Orem with word processing capability for the system. However, the company did not have the staff or the resources to develop such a program. Through friends, Bastian learned of Eyring's dilemma and approached the company with an interesting proposition. While on Eyring's payroll, he would develop and deliver a word processing program to the city, but would keep all product development rights to the new system. Eyring accepted the proposal, and Bastian began work immediately. Ashton remained at BYU and continued teaching.

Almost one year later, WPCorp had a viable product. Bastian left Eyring, and together with Ashton, again offered Owens a partnership. Owens agreed to rejoin the company as a full partner responsible for sales and marketing. The first copy of SSI*WP, the product's original name, was sold in October 1980. Later that year, Bastian offered "Pete" Peterson a part-time position doing a variety of odd jobs. Peterson was supplementing his income by stocking shelves at a local grocery store while his custom drapery business faltered. Peterson accepted Bastian's offer but quit the first day after discovering that the new company was in a state of total disarray and headed for disaster. Not only was the firm without a business license, it had no standardized accounting or payroll system. All the financial records had been "filed" for later scrutiny. After a quick assessment, the founders concluded that neither had the business acumen to establish and implement the necessary procedures. Peterson agreed to return under the condition that he assume responsibility for all the firm's financial matters.

Under Owens' direction, sales flourished; his marketing strategies appeared to be working. However, by mid-1981 a serious situation was brewing. With no formalized structure in place, Owens had adopted a "whatever the customer will pay" approach, selling the same software program to each customer for a different price. Word of this practice soon spread, and the founders were deluged with calls from angry customers. Ashton and Bastian quickly formulated a pricing system, made amends with unhappy customers, and seriously considered asking Owens to leave the company. However, the company had no one to replace him.

The Personal Computer Comes of Age

In August 1981, IBM introduced its first PC. Although Apple Computer, along with a handful of other manufacturers already had PCs on the market, IBM's announcement spearheaded a revolution in the industry. IBM's strategy was to develop a PC using an "open architecture" design that was easily copied by other entrants to the market but allowed a high degree of software compatibility. Concurrently, IBM's reputation as the industry leader lent credibility to the concept of microcomputers for individual users. IBM's announcement did not go unnoticed by WPCorp's founders. Early in 1982, development began on a word processing program for the IBM PC. The first product was quietly introduced in October 1982. Despite its late introduction and lack of fanfare, SSI*WP 2.2 sold well and sales revenues reached $1 million by the end of the year.

Unable to reconcile personal differences, Owens was finally asked to leave the company. He conceded on the condition that he keep his stock position. No value was placed on the stock at that time, and Owens agreed to wait until the company stabilized before receiving a stock redemption. This agreement turned out to be a costly one for WPCorp a few years later. Peterson assumed the duties of sales and marketing manager, but within several months passed this responsibility to a young programmer named Dan Lunt.

By the beginning of 1983, demand for personal computers was skyrocketing. IBM had released its own PC, and the IBM "clones" were flooding the market. Within a year, factory shipments of PCs totaled $4.2 billion. The ensuing demand for software, especially word processing software, was enormous. WPCorp responded by introducing three product upgrades. Fueled by an expansion in both the computer hardware and software market, sales for 1983 increased 250 percent.

As sales escalated, so did the company's profits. With a profit margin averaging 30 percent annually, the founders decided to reincorporate as a Sub-S Corporation. This action shifted the tax burden to the individual owners allowing them to keep a larger portion of the profits. They, in turn, plowed most of this profit back into the company. The company also changed its name to SSI Software, in the hopes of changing its image locally. With the word "satellite" in its name, people thought it was an equipment manufacturer and often walked into the office requesting price quotes for satellite dishes.

In 1984, WPCorp created its first spin-off. Until that time, all manufacturing activities were done in-house. Manufacturing in a software firm involves copying programs onto diskettes, then packaging these programs, along with product manuals, for shipment. Typically this is a noisy, dirty process, and created an environment that the founders felt compromised the creative integrity of the firm. This problem was resolved when SoftCopy, Inc. was created. Although WPCorp did not retain a financial interest in the firm, it continued to have SoftCopy, Inc. manufacture its products.

Reorganization

WPCorp has undergone two major reorganizations. The first was the result of the problems encountered after the introduction of WP 4.1. Prior to that release, product development, testing, and some customer support services were the responsibility of one group -- programmers. As revenues increased, more customer support and service was needed. This need became glaringly obvious when the company was receiving customer queries about the availability of new products. Programmers were spending most of their time on the phone instead of on product development. The company had simply outgrown the confines of the existing organizational structure and the first steps toward labor specialization were made. The most important change was in the Customer Support Department. Training was expanded, overall employment was increased, and programmers were phased out of the support and service function.

The second reorganization occurred in 1986. WPCorp was in the position of competing with the "big boys" in the software field. While it was still a small company when compared to Lotus or Microsoft, it was outselling other well-established rival programs like WordStar and Multimate. With employment and sales doubling annually, WPCorp had outgrown its new organization structure, not to mention its office space. By the time the company's sales hit $50 million, the founders knew it was time for a change. Typically the work environment in early stage computer firms is casual and informal. WPCorp was no exception. In the early years, each potential employee went through an exhaustive interviewing process during which he or she met with top management and at least one of the founders. All new employees had to be approved by every interviewer. In addition, hiring protocols, employee evaluations, wage and salary considerations, and personnel problems were all negotiated informally by the founders. Job descriptions were not well defined -- people did whatever needed to be done. As the company grew, the problems became more complex and the founders could not carry the burdens alone.

A personnel office was established to screen potential employees and policies were implemented that significantly changed hiring and training procedures. All potential employees were required to apply through the personnel office. While programmers were still interviewed by top management, customer service and general office personnel were hired directly by division managers. The training program for new customer service employees was restructured. When the labor force was increasing by two to three people per week, the company was able to provide individualized training. When up to 10 new people per week were being added, this was simply impossible and training was conducted in groups. New levels of management were created in several existing departments, including customer support.

Rapid expansion was taking its toll in another area as well. WPCorp had outgrown its office space and was mushrooming into offices scattered throughout the city of Orem, making communication between divisions difficult. In order to resolve this situation, the company purchased 8.5 acres in the Timpanogos Research and Technology Park in Orem and began construction of a 200,000 square-foot complex in 1986. Before the first phase of the project was complete, WPCorp decided to consolidate its 25 departments in the Research Park and purchased an additional 60 acres. The first four buildings of the facility are scheduled to be completed by the end of 1988.

Capital Sources

WPCorp was "bootstrapped," or started with founders' capital. At no time has WPCorp used venture capital. All initial operating costs were paid either by the founders or with money borrowed from family members. The company's founders have aggressively pursued a fiscal conservatism that has kept the company almost totally debt free.

Seed Money

Traditionally, the software market has been an easy one to enter and just as easy to exit. Much of its appeal stems from this ease of entry combined with the opportunity to make phenomenal returns with a minimal capital investment. Software development is labor intensive and generally does not require substantial capital commitments; more often, the requisites are a computer, a diskette, and a programmer.

Even so, WPCorp's founders were in a unique position. Both continued their employment with other organizations during the early product development process. All the early capital requirements were met by the founders. The initial development work was done on Orem's computer system at no cost to the entrepreneurs; in fact, Bastian was paid by Eyring Research to develop the product, and Ashton continued teaching at Brigham Young University.

Cash Flow Financing

Since its inception, WPCorp has financed its operating expenses and expansion almost exclusively through product sales. The company's start-up costs were negligible, and profit from the sale of the first product covered what few expenses the company did have. As WPCorp grew, only those activities which could be funded with cash flow were undertaken. The result of this mindset has been impressive. From 1982 to 1985 the company's pretax profit margin was 20 percent. In 1986 this ratio rose to 30 percent and is expected to remain at that level for the next few years. In comparison, the industry average, as reported by William Easterbrook, an analyst with Kidder, Peabody & Company, is holding at 15 to 25 percent. How is WPCorp able to maintain such high margins? The answer is twofold. First, it is virtually debt free (the result of the founders' fiscal conservatism); and second, it has a ready supply of low-cost labor.

The financial position of the company has not escaped the attention of potential investors. The company has been approached by a bevy of venture capital groups, but has not explored this alternative.

Product Strategy, Development and Diversification

WPCorp has followed a simple, yet effective product development strategy -- develop an increasingly powerful product for an increasingly broad range of computer systems. This has been a twofold effort. First, the company continues to upgrade its existing products by adding powerful new features. Second, these products are developed for as many different types of computer systems as possible. Typically, the development of upgrades for the IBM series of computers has taken precedence since it represents the largest installed user base. Upgrades for proprietary computer systems are developed and introduced depending upon the complexity of the system. As each new upgrade is complete, it is provided to the customer for a nominal fee (usually between $40 and $60). To the extent possible, upgrades are introduced at the peak of the existing product's life cycle.

By 1983, WPCorp's sales had reached a respectable $3.5 million but the company was still a relative unknown. Fifteen of the 16 largest software companies were concentrated on the east or west coasts and received a good deal of press from industry analysts. WPCorp was tucked away in the small city of Orem, Utah and went almost unnoticed during its early years. This situation changed abruptly when the company introduced WP 4.0 and WP 4.1, two powerful software programs that set the precedent for all future word processing programs. Product development decisions are market-driven. New product ideas do not originate solely in-house; rather, product development is a blend of internal ideas and external suggestions. On average, the company receives 30 to 35 letters and 75 phone calls each day from customers specifically requesting certain options or new products.

A Leap in Technological Superiority

With the introduction of WP 4.0 in November 1984, the company made a strategic change in its product development efforts and reiterated its commitment to customer satisfaction. While previous product upgrades provided enhanced features, they were typically incremental changes. WP 4.0 was a quantum technological leap. The new program offered automatic indexing, table of contents, and footnoting construction capabilities, and a 100,000-word spelling checker. All these enhancements were easy to use, and were not widely available in other word processing programs on the market.

Almost a year later, the company introduced an even more powerful product, WP 4.1. Again, this new release was a major leap in technological performance, rather than an incremental improvement. The spell checking feature was expanded to check 115,000 words, (one of the largest integrated spellers on the market), a thesaurus with over 10,000 headwords was added in addition to split-screen capabilities (allowing the user to view the document on the top of the screen and the control codes on the bottom half of the screen); and most importantly, it provided a new "undelete" capability. This particular feature caught the eye of computer magazine writers who published unsolicited reviews expounding on the virtues of WPCorp's products. The result was skyrocketing sales, and by the end of 1985, WPCorp's revenues increased to $23 million.

Keep the Customer Satisfied

In a race to get products to market, many software companies introduced programs that were not easy to upgrade because they were poorly-designed initially. As the customer became more sophisticated and demanded a greater number of features, integration of new features in these poorly-designed products was impossible and the companies were forced to redesign the entire program, including the way the software was accessed. This proved to be a strategic mistake. If the new product was significantly different from the existing one and the customer was forced to relearn the entire program, there was a greater incentive for him to evaluate what other companies had to offer. This evaluative process usually resulted in the user switching to another product.

To avoid this very problem, WPCorp took great pains to make 4.0 and 4.1 almost identical in the way they were accessed. Customers were satisfied and the corresponding demand caught the company off guard. Distributors were reporting back orders for as many as 300 copies of 4.1. WPCorp had a backlog of more than 11,000 copies, including upgrades from 4.0. The bottleneck was the printing company. The company had arranged with a local printing company to reproduce product manuals. With hundreds of orders pouring in each week, the printing company ran out of supplies, and it was several months before WPCorp was able to make back-up arrangements with other printers in the area.

Product Development

By the time WP 4.1 was introduced in 1985, WPCorp's products were compatible with 12 different systems including Tandy, Zenith, Texas Instruments, Keytronic, and Apple Computers. WP 4.1 was followed by a minor upgrade, 4.2, a year later. One of the new features of 4.2 was its document annotation capability, and a concordance feature that allows the user to create a list of key words that can be included in an index. It also provided the capability to generate a table of authority, and redline and strikeout functions that were especially appreciated by the legal profession.

In 1987, the company announced that it was developing a product with high-end word processing features and desktop publishing capabilities. When 5.0 was finally released early in 1988, it was immediately crowned the "new benchmark in word-processing." Building upon the powerful base of 4.2, version 5.0 added page layout and documentation composition abilities. Of special importance was its ability to incorporate and integrate work with graphics, typestyles, kerning, and document preview. During the first month of release, WPCorp shipped over 200,000 copies of the new product.

To remain competitive, WPCorp continually re-evaluates its development strategies. Recently, it announced that it could no longer support and would not develop version 5.0 for many of the "incompatible" computer systems, including the DEC Rainbow, TI Professional, Tandy 2000, Zenith Z/100, Victor 9000, NEC APC III, and Apricot.

Product Diversification

By late 1984, WPCorp's founders realized that the word processing market would not continue to expand indefinitely, and other areas of product development were investigated. Satisfied with the company's word processing program, customers had expressed the need for spreadsheet software and database management programs based on a format similar to that of the word processing software. Responding to customer's requests, WPCorp began developing MathPlan, a spreadsheet program (later renamed PlanPerfect) that used a format similar to that of the word processing program. MathPlan, released in 1985, was the company's first venture into software development outside the range of word processing.

Seven products were introduced in 1986; six were upgrades of existing products, the last was a utility program featuring a DOS shell, desktop accessories and programming tools called WPCorp Library. WordPerfect Library was available for the IBM PC and compatible systems, Data General One, IBM Convertible and Data General 32-bit systems. The company also began development work on a database management program. This relational database (DataPerfect) was introduced in December 1987. As word processing software is the company's mainstay, WPCorp has made a concerted effort to introduce a version for every major computer system currently on the market and is in the process of developing a product for the recently introduced Operating System/2.

Presently, WPCorp sells seven different product families. These are: (1) WordPerfect (word processing program), (2) PlanPerfect -- A full featured spreadsheet with integrated graphics and database capabilities, (3) DataPerfect -- A structured relational database management program, (4) WordPerfect Library -- A utility program featuring a DOS shell, desktop accessories and programming tools, (5) P-Edit (a program editor for Data General computers and IBM computers), (6) WordPerfect Executive -- A spreadsheet analysis, word processing, and data management program for the laptop computer, and (7) WordPerfect Office -- an office automation program that combines electronic mail, phone messaging, calendar, scheduler, and notebook. A complete listing of WPCorp's products appear in Exhibit 1.

Marketing

WPCorp has two separate marketing arms -- one that serves the domestic market and another for the foreign market. The domestic division is under the jurisdiction of Dan Lunt and covers the United States. Bruce Bastian heads up the international activities, covering everything outside the country. Approximately one-third of the company's labor force is involved in marketing activities.

Domestic Market

WPCorp's products are available throughout the U.S. Forty percent of the company's customer base consists of large corporations such as Ford Motor Company, Merrill Lynch, Chrysler Corporation, and Texaco, Inc. Although the company places advertisements in national computer magazines and participates in distributor cooperative advertising campaigns, much of the advertising is still "word-of-mouth."

Marketing/Advertising Efforts

In its early years, WPCorp's marketing efforts were aimed at organizations with mainframe systems that needed word processing capability. Product sales were made through personal contacts, cold calling, and customer recommendations. Formal advertising efforts began in April 1982 when the company placed its first national advertisement in *Data Base Monthly*. This ad, and all ads placed until late in 1983, were targeted at the Data General computer user who wanted word processing capability for the Data General minicomputer. However, the PC market showed the most promise, and in order to increase its market share, WPCorp needed a higher profile. In the latter part of 1983, advertisements were placed in national computer magazines including *PC World*, *InfoWorld*, and *PC Magazine*. The first ads were developed in-house, and are considered by the company to have had little impact on sales. Later, the company

Exhibit 1

Product Development Matrix
WordPerfect Corporation

1982	1983	1984	1985	1986	1987	1988
WordPerfect 2.2 - IBM PC/series **P. Edit** - Data General(16 bit)	**WordPerfect 2.22** - IBM PC/series **WordPerfect 2.24** -IBM PC/series **WordPerfect 2.30** - IBM PC/series **WordPerfect 2.30A** - IBM PC/series - Sterns - TI - Victor - Zenith **WordPerfect 3.0** - Apricot - DEC/Cripple - IBM PC/series - Tandy - TI - Victor - Zenith	**WordPerfect 4.0** - Apricot - DEC - Generic Network - IBM PC/series - NEC - IBM 3270 - Tandy 2000 - TI - Zenith/Network - Victor/Network	**WordPerfect 4.1** - Apricot - Apricot Network for the blind - DEC - NEC APC - HP Portable Plus - Hyperion - IBM/Network - IBM 3270/Network - Keytronic - Data General One - Tandy 2000 - TI/Network - Victor/Network - Zenith **WordPerfect 1.0** - Apple IIe/IIc **PlanPerfect 2.0** - Data General One - IBM PC/Series - Victor	**WordPerfect 4.2** - Apricot - DEC - HP Portable Plus - IBM/IBM XT 286 - NEC APC - Network - Tandy/2000 - TI - Victor - Zenith - IBM 3270 - IBM Convertible - IBM PCjr. - Data General One **WordPerfect 4.05** - Data General (16-bit) **WordPerfect 4.08** - VAX/VMS **WordPerfect 1.1** - Apple IIe/IIc - Apple IIGS **WordPerfect 2.0** - Apple IIGS **PlanPerfect 2.1** - Data General One - IBM Convertible - Victor **PlanPerfect 2.11** - Data General (16-bit) **PlanPerfect 3.0** - IBM PC/Series **WordPerfect Library 1.0** - Data General One - IBM Convertible - Victor - Data General (32 bit)	**WordPerfect 4.1** - Amiga - Atari ST **WordPerfect 1.1** - Franklin 2100-2200 **WordPerfect Executive** - IBM PC/Series - IBM Convertible - Data General One - Toshiba T1100+ - Toshiba T3100 - NEC Multispeed - Compac Portables - Zenith **P. Edit 4.05** - Data General (32 bit) **PlanPerfect 3.0** - Data General One - IBM 3270 **DataPerfect 2.0** - IBM PC/Series - IBM 3270 **WordPerfect Library 1.1** - IBM PC/Series -IBM XT 286	**WordPerfect 5.0** - IBM PC/Series - Compatibles **WordPerfect UNIX 4.2** - AT&T 382 - AT&T 6382 - NCR Tower 32 - Sun 386i - HP9000 (300 series) - Pyramex - Motorola - Micropoint 386 - SCO Xenix 386 **WordPerfect 4.2** - VAX/VMS - Data General **WordPerfect 1.0** - Apple Macintosh **PlanPerfect 3.0** - VAX **WordPerfect Office 2.0** - IBM PC/Series - IBM PC compatibles - VAX **WordPerfect Office** - Data General **WordPerfect Library** - Amiga **WordPerfect Library 2.0** - IBM PC/Series - IBM PC compatibles

turned to "reference" or testimonial advertising. This testimonial approach, according to the marketing director, was a highly successful tactic.

Word-of-Mouth Advertising Still Dominates

Advertising expenditures are kept to a minimum. The company has assumed a "pay-as-you-go system" that bases advertising expenditures on a percentage of product sales. In 1983, the company spent 10 percent of sales revenues on advertising. That percentage was reduced to 6 percent of sales in 1984 and 1985 and reduced again in 1986. The current advertising budget sits at 2 percent of sales, or approximately $160,000 to $200,000 per month. Advertisements in national computer magazines represent the largest single advertising expenditure. An additional $200,000 per month is available under a distributor cooperation program sponsored by the company. Under this program, WPCorp offers distributors a choice between free shipping, or co-op funds. If a company opts for the co-op plan, WPCorp will match the advertising expenditures of the company up to a prearranged percentage of the total sale.

There are no plans in the immediate future to increase advertising expenditures. According to the marketing director, the correlation between dollars spent for advertising and subsequent product sales is a tenuous one and increased spending for advertising will not result in proportional increases in product sales. Word-of-mouth advertising, in the form of customer recommendations and unsolicited reviews in national magazines, is still the primary source for new customers, accounting for as much as 60 percent of product sales.

WPCorp has not made a practice of selling to the end-user. Instead, the company has worked through a distribution network selling its products through retail dealers and distributors. Although potential customers have not been turned away, those who choose to purchase directly from the company pay the full retail price.

Program upgrades are handled in just the opposite manner. The Orem office contacts all registered users of its products when an upgrade becomes available. The customer then orders and purchases that upgrade directly from WPCorp in Orem.

Simple Marketing Philosophy

"Develop a quality product and then service it!" This motto reflects not only the corporate philosophy, but is the driving force behind WPCorp's marketing strategy. To this end, the company is actively pursuing one strategy in particular that runs counter to prevailing trends in the industry, that is, providing extensive customer support at no charge.

No software company in the industry comes close to matching the level of customer support that WPCorp provides. At a time when most of the principal software manufacturers are either charging for customer support or not providing such service at all, WPCorp has expanded its division to the point that customer support personnel constitute approximately one-third of the labor force. The Customer Support Department is a group of highly trained individuals who specialize in handling customer questions, complaints, and suggestions quickly and efficiently over the telephone, or through written correspondence. Members of the group have a thorough knowledge of the company's products and are familiar with each product's particular computer system. This service is provided to the user at no charge. A toll-free phone number is provided for all PC products. On average, the Customer Support Department receives 3,600 to 3,800 calls per day; however, with the introduction of its latest word processing program, 5.0, this number increased to 10,000 calls daily. By fostering goodwill, this service encourages users to consider other WPCorp products.

International Market

WPCorp's first step in the international market was taken in 1981 when Bastian received a telephone call from the Finland distributor of Data General's computer system requesting a copy of WPCorp's word processing software translated in Finnish. Bastian flew to Helsinki and quickly translated the software, adapting it to Finnish standards (including adjusting the margins, page lengths, and style of date).

Despite the success of this project, almost two years elapsed before the company was able to commit the resources to develop an international presence. Rather than establishing an office in each foreign country initially, Bastian met with foreign affiliates and distributors of computer products and offered them the opportunity to distribute WPCorp products. Each foreign entity was responsible for the translation and distribution of the program. In addition, they were to provide support and service to customers in their respective region. In 1987, WPCorp decided to expand its international presence, and opened its first official foreign office in West Germany. Later that year, four new international corporations to sell WPCorp's products internationally (WPCorp Spain, WPCorp Holland, WPCorp France, and WPCorp Belgium). During 1988, two new offices were established in Australia and Scandinavia. These corporations function independently of the Orem-based company. Presently, the company markets its products through these offices and through distributors in Brazil, Canada, Denmark, Finland, Hong Kong, Iceland, Japan, Mexico, and the United Kingdom. Approximately 20 percent of WPCorp's revenues come from overseas customers.

Sales

WPCorp's marketing strategies are working. The company's sales have increased by more than 100 percent annually since the release of WPCorp for the PC market. By the end of 1987, the company's sales revenues topped $100 million. Based on the success of 5.0, sales are already on their way for another giant leap in 1988.

Exhibit 2

WordPerfect Corporation Sales
Selected Years

1980	$ 450,000
1981	850,000
1982	1,000,000
1983	3,500,000
1984	9,300,000
1985	23,000,000
1986	52,200,000
1987	102,000,000

Source: WordPerfect Corporation.

Employment Profile

By November 1, 1988, approximately 1,100 people were on WPCorp's payroll. However, the company's labor force increases daily and may reach 1,200 by the end of December. All but 64 employees work in Utah. Out-of-state employees work to foster dealer/distributor relations throughout the country. The Utah labor force can be categorized into three main divisions; product development and testing, customer support, and marketing. Although the educational requirements in each group vary, 80 percent of the labor force has either an undergraduate college degree or post graduate degree. The remaining 20 percent have at least two years of post high school education.

The company has no production component. All production-oriented activities are contracted out to firms in the Orem area. The non-technical element of the labor force includes customer support, testing personnel and clerical employees. The technical element includes product and program development personnel. This latter group is comprised primarily of computer programmers.

The company does not actively recruit on any campus outside the state, and between 90 and 95 percent of employees have been hired from Utah's labor pool. The remaining 5 to 10 percent hail from all areas of the U.S. Many are native Utahns who want to return to the state. Turnover at the company averages about 6 percent annually.

Employment growth, in actual numbers, has been most phenomenal during the past two years when the company added approximately 800 new people to the payroll. According to the Personnel Director, the areas that will see the most rapid expansion are product development and customer support.

Exhibit 3

WordPerfect Corporation Employment
Selected Years

1982	16
1983	48
1984	85
1985	199
1986	310
1987	600
1988[a]	1,100

[a] Reflects employment through November 1988

Source: WordPerfect Corporation.

Non-Technical Personnel

Excluding administrative functions, the non-technical component of the company includes the customer support group and some program testing personnel. Employment in these two areas accounts for almost one-half of WPCorp's labor force. The characteristics and labor components of each area are discussed here.

Customer Support

With over 400 employees, the Customer Support Department is the largest single non-technical component of the company's labor force and is considered to be the entry level position for non-technical employees. From this group, people can move to other areas such as program testing, documentation, and occasionally product development. An employee in Customer Support is required to provide technical information for end-users and dealers of WPCorp products. More than half of the employees in this group are BYU students, and student's spouses. The salary range is from $1,200 to $2,200 per month depending upon the individual's previous experience and education. Because it is an entry-level position, and given the basic composition of the work force, turnover in this group is about 30 percent annually. The company requires a one-year minimum commitment to the position.

Product Testing/Documentation

Many employees in product testing come from the Customer Support Department. The rigorous training program that employees must complete in Customer Support, combined with on-the-job work experience makes this a natural transition. Activities in this division include testing new product releases and updates and product documentation. Employees in this group also help employees in the customer support group reproduce customer problems and subsequently provide answers to these problems. For positions in this area, the company requires college-level training and previous work experience. Turnover in this group is substantially lower than in customer support simply because the composition of the labor force is different. Though these positions are better paying, they are also filled by employees who have gone through the weeding-out process and who view the position as more than a short-term assignment.

Availability of Non-Technical Personnel

To date, the company has easily met its non-technical labor requirements. The entry-level positions in customer support are filled with students, or student's spouses from the nearby university. Product testing positions are filled with motivated employees who want added responsibilities and better pay. Other non-technical, professional positions are sometimes filled with MBA graduates or other social science graduates. However, the company is reluctant to hire graduates from these disciplines because "they think the world owes them a living," and beginning salary expectations are much higher than the company is willing to pay.

Technical Personnel

The Product Development Group is the key technical component of WPCorp's labor force carrying out the R&D functions. These R&D activities take two forms; the first is new product development, and the second is product enhancement. The academic requirements for this group are the most stringent in the company. WPCorp looks for only those computer science students with the highest grade point averages, the most impressive academic achievements, or substantial work experience. Computer programmers represent approximately 20 percent of the labor force.

The Product Development Group is separated into five divisions representing different computer platforms supported by WPCorp's products. The five divisions are as follows:

PC Division -- With 50 employees, this is the largest division of the group and develops products for the IBM PC, PC/XT, PC/AT, PCjr., IBM 3270, OS/2 and all IBM PC compatibles.

Data General Division -- Has 20 employees who develop products for the Data General (DG) line of computers including the DG mainframe AOS/VS 16-bit and 32-bit system.

Macintosh Division, Amiga Division, and Atari Division -- These divisions are grouped together and employ a total of 50 people. The products developed by this division include software for the Apple IIe, IIc, and IIGS systems, software for the Amiga computer line, and software for the Atari computer line.

VAX Division -- The division employs 30 people who develop software for all VAX/VMS-based systems including Digital Equipment Corporation's 8974 and 8978 machines.

UNIX Division -- This is WPCorp's newest division. WordPerfect for UNIX systems is designed by this group. The most recent product release (WordPerfect 4.2) supports the AT&T 3B2 and NCR Tower 32 lines. Other implementations include the SCO Xenix 386, Microport 386, AT&T 6386, and Sun 3 machines.

WPCorp's programmers receive salaries that are competitive with those paid by other companies in the software industry. Although salaries vary depending upon the individual's skill level, the average salary is above $24,000 and with the company's bonus incentives, in some instances, can reach $100,000.

Wage and Salary Trends

Typically, WPCorp pays new employees less than industry average, but the high producers are given more responsibility and are promoted more quickly than would be the case in other firms. Not only does this policy act as an incentive, it also weeds out unproductive employees. Bonuses are another performance-based reward. In addition to providing an incentive, this strategy insulates the company from laying off employees in years when profits are low because the wage component is too high.

Recruitment

WPCorp Corporation does not actively recruit on any campus or in any state. Nonetheless, the company is receiving between 100 and 200 applications and resumes each week. Given the close proximity of BYU and the absence of similar job opportunities in Utah County, the non-technical positions have been easily filled. On the other hand, rapid expansion is requiring the addition of new technical people (specifically those with mainframe experience) who are becoming harder to find without an active recruitment program in place.

WPCorp is looking for the brightest computer science graduates, as is every other computer software and hardware manufacturer in the country. Typically, these graduates do not search out a company, instead, companies search for them. The absence of a recruitment program puts WPCorp at a disadvantage in vying for the talents of bright people. Another problem facing the firm is the shortage of computer science graduates with mainframe experience. According to the personnel director, the universities in Utah are not graduating students with the type of mainframe experience and background needed and the company may have to go outside the state to find people with such skills.

Higher Education and Vocational Programs

Higher education plays an important role in providing WPCorp with an abundant labor supply. BYU is the source of a significant number of employees in Customer Support and subsequently Product Testing and Documentation. The university is also a prime supply source for the technical and professional needs of the company. Outside of providing a labor source, interaction between the two organizations is limited.

Vocational education plays a much smaller role. The company does require that its employees have at least two years of post high school education which could include, but is not limited to, vocational training.

Why Utah?

Simply put, WPCorp was established in Utah because the founders lived and worked in the state. However, the company could have succeeded anywhere and over the course of the past eight years, has had ample opportunity to relocate. So why stay in Utah? Many of the reasons given are typical -- ready supply of labor, low cost of living, and quality lifestyle. In addition, Utah offers locational advantages that are unique -- Brigham Young University, a low profile, and a solid religious environment.

Availability of Labor

Utah has an abundant supply of well-trained people. With three large universities, the state graduates more students each year than there are jobs to fill. This situation is exacerbated by the fact that many people, both natives and non-natives alike, enjoy the quality lifestyle and clean environment Utah offers. Combined, these two components result in a well-educated labor force at an overall labor cost that is somewhat below the national average. An added advantage for WPCorp is its location in Orem, where labor costs are generally even lower than in Salt Lake City.

Utah -- A Low Profile in the Software Industry

Interestingly, one of the early locational advantages of Utah for WPCorp was the state's low profile. Hardly considered a hotbed of software activity, the company was largely unnoticed by industry analysts for the first few years -- a situation that allowed WPCorp to break into the market without the same scrutiny given software firms in areas such as California or Massachusetts. By the time WPCorp hit the market full-force, a solid customer base was established with a fully developed product that differed significantly from other software products on the market.

Brigham Young University

Brigham Young University has been and will continue to be an important factor in the WPCorp success story. Although there is no formalized interaction with BYU on an academic level, the university is a primary source of employment at all levels of technical expertise for the company. Close to 75 percent of WPCorp's labor force are either BYU graduates, students, or spouses of students. BYU students and spouses of students comprise over 50 percent of the employment base in the company's Customer Support Department. Technical people come from the ranks of the university's computer science department and non-technical professionals (primarily MBA graduates) from the business school. Finally, WPCorp's proximity to BYU has kept recruitment efforts and expenses to a minimum.

The Role of Religion

WPCorp's employees are a homogenous, close knit group of people committed to the precepts of the Mormon religion. Both of the founders are members of the Mormon Church, and their management styles, work ethics, and corporate philosophies reflect their religious convictions. These attitudes are echoed by the employees, a significant number of whom share these convictions, forming an extremely cohesive work force that is easily supplemented by people in the Provo/Orem area. The religious tenets prohibit drinking and smoking, habits that have been proven to adversely affect worker performance. Executives of the company feel this strong religious commitment has resulted in lower absenteeism rates and higher productivity levels than would be found in areas outside the state.

Disadvantages

Utah has its disadvantages as well. A primary disadvantage to the founders is the state's high personal income tax rate. Increases or changes in the rate of personal income tax is especially significant for the company's founders given the firm's Sub-S status. Instead of paying the corporate tax rate, the principals are required to claim the profits as personal income and must pay the personal income tax rate which they feel is too high. At one point, prior to the tax increase in 1987, the founders considered decentralizing the Orem operations by relocating out of the state, but upon more careful consideration, decided against the move.

Another potential disadvantage is presently a benefit, that is the strong influence of the Mormon culture. While this culture discourages many of the bad habits that ultimately affect employee performance, it also sends out a message to non-Mormons that they may not feel comfortable living or working within the confines of such a culture. The company is already having difficulty filling its highly specialized positions from Utah's work force and if its present growth rate continues, recruitment outside the state may be necessary. While not a pressing issue at present, the religious influence of the surrounding area may act as a deterrent in recruiting outside talent.

Future Issues

The very success that made WPCorp a highly profitable organization is taking its toll. The company is growing from a small, cohesive group of people committed to similar goals and objectives to a large, more bureaucratic and segmented environment. It is increasingly difficult for the company to preserve its "down home, small town" environment, to help the new recruits "catch the feeling" ~~of~~ what the company is trying to achieve. It has been said that a new employee entering the firm today would view WPCorp as "just another large company."

Labor is another issue that WPCorp must grapple with. A good deal of the company's success can be attributed to its high degree of customer support. Part of the reason the company has been able to provide this service is the availability of low cost labor in Utah County. In recent months, new firms have announced intentions of establishing facilities in the area and are offering substantially more money for jobs similar to those in WPCorp's Customer Support Department.

Continuing growth has forced the company to again evaluate its organizational structure and to specialize even further. The Customer Support Group is a prime example of one change. Until a month ago the group was managed by one person. This large division has now been divided into seven divisions representing each of the computer systems for which the company develops products. Each smaller division has its own manager who reports to the supervisor. All other personnel in the department report to a group manager. As the company continues to grow, further organizational refinements and policy formalization will be undertaken.

Conclusion

By all definitions, WPCorp is a proven player in the software industry. With sales topping $100 million in 1987 (and estimated to rise to close to $200 million in 1988), it is the leading maker of word processing software in the world. By the end of 1987, total units sold since the company's inception topped 1.195 million; word processing units account for almost 90 percent of that figure and are still the company's primary source of revenue. The obvious question is how long can WPCorp sustain this exemplary growth rate. The software industry is burgeoning. By 1990, some industry experts predict the software market to hit $127 billion. With such a staggering growth rate, and the relative ease with which companies can enter the market, industry competition will intensify. While WPCorp has created a prominent niche for itself in the area of word processing, it will need to further broaden its product line to maintain this position over the long run. This will be no small feat, as the company is competing with the likes of Microsoft, Inc. (presently has 20 percent of the word processing market), Lotus Development Corporation (the established leader in the spreadsheet market), and Ashton-Tate (holds the dominant position in the database software market).

WPCorp's success story is an unusual one. In eight years the founders of WPCorp Corporation have created a software company with 30 percent of the market for word processing software. Possibly the single most significant contributing factor to this success was the phenomenal growth in demand for computers, especially the demand for IBM PC and PC compatible machines.

The rapid expansion of the computer industry acted as a catapult for the company's word processing software. As sales of personal computers increased, demand for software increased accordingly. WPCorp's founders had developed a product superior to anything else on the market, and with their programming skills, modified the program for use on the PC machines. By offering extensive customer service and support, the company strengthened and expanded its customer base.

Although the company's story is one that could be repeated in any part of the country, a Utah location played an integral role in the firm's success. Perhaps the most important locational advantage for WPCorp has been the company's proximity to Brigham Young University (BYU). Not only did BYU provide an employment opportunity for Ashton during the initial start-up phase of the company, it has provided an abundant pool of highly educated employees at a reasonable cost.

While WPCorp may serve as a role model for other fledgling software firms, it will be an experience that is not easily duplicated. The computer industry has "grown up" over the past ten years and is dominated by three or four large companies. Even with sales of $100 million in 1987, WPCorp trails Lotus Development Corporation by $275 million and Ashton-Tate Corporation by $170 million. Furthermore, Ashton-Tate's word processing program, Multimate, is gaining popularity and with 12 percent of the word processing market, could pose a threat to WPCorp in the future.

Utah Business Statistics

UTAH DATA	July 1987	July 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,171	NA	NA	NA	18,566	NA
New Corporations (no.)	447	413	-7.6%	469	442	6.1%
New Car, Truck and Motorhome Sales (no.)	5,417	NA	NA	NA	5,470	-19.1%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	63.50	64.70	1.9%	66.13	60.70	8.9%
Lambs (cwt)	74.80	55.40	-25.9%	68.11	70.82	-3.8%
Milk Wholesale (cwt)	11.40	10.80	-5.3%	11.59	12.03	-3.7%
Alfalfa Hay, Baled (per ton)	71.00	75.00	5.6%	72.33	64.67	11.9%
Cattle Slaughtered (live weight) (thous. of lbs.)	45,148	45,846	1.5%	45,211	39,686	13.9%
Construction						
Total Construction (thous. of dol.) 1	167,236	113,840	-31.9%	115,746	126,598	-8.6%
Residential	56,418	63,365	12.3%	47,586	55,396	-14.1%
Nonresidential	52,185	12,883	-75.3%	41,402	41,392	0.0%
Public Works and Utilities	58,633	37,592	-35.9%	26,793	29,809	-10.1%
Total Permit Construction (thous. of dol.) 2	96,045.6	68,515.0	-28.7%	76,891.9	98,824.1	-22.2%
Residential	48,270.7	37,251.0	-22.8%	34,717.2	50,473.0	-31.2%
Nonresidential	31,761.0	13,962.2	-56.0%	28,076.5	34,895.5	-19.5%
Additions, Alterations and Repairs	16,013.9	17,301.4	8.0%	14,098.9	13,452.6	4.8%
New Dwelling Units (no.)	663	528	-20.4%	486	793	-38.6%
Employment						
Civilian Labor Force (thous.)	751.5	743.0	-1.1%	755.2	757.9	-0.4%
Total Employed Persons	705.4	708.8	0.5%	713.5	709.8	0.5%
Unemployed Persons	46.1	34.2	-25.8%	41.7	48.1	-13.3%
Percent Total Labor Force	6.1	4.6	-24.6%	5.5	6.4	-13.4%
Employees on Nonagricultural Payrolls (thous. of jobs)	634.6	650.6	2.5%	646.6	636.8	1.5%
Manufacturing	92.9	97.3	4.7%	95.0	90.9	4.6%
Mining	7.9	8.5	7.6%	8.3	7.7	7.3%
Contract Construction	28.5	26.0	-8.8%	24.7	29.0	-14.8%
Transportaion, Communication and Utilities	37.8	39.2	3.7%	38.4	37.5	2.4%
Wholesale Trade	34.8	34.8	0.0%	34.9	35.4	-1.4%
Retail Trade	117.2	119.2	1.7%	118.1	117.8	0.3%
Finance, Insurance and Real Estate	34.5	34.2	-0.9%	33.8	33.5	0.7%
Services 3	148.6	157.2	5.8%	151.9	142.8	6.4%
Federal Government	39.8	39.5	-0.8%	39.5	40.2	-1.9%
State Government 4	35.5	36.3	2.3%	37.6	38.0	-0.9%
Local Government 5	57.2	58.4	2.1%	64.4	63.7	1.2%
Average Weekly Hours						
Manufacturing	40.3	40.6	0.7%	40.3	39.6	2.0%
Mining	41.2	43.0	4.4%	42.6	41.2	3.3%
Wholesale Trade	39.3	38.3	-2.5%	38.0	37.7	1.0%
Retail Trade	29.0	29.0	0.0%	28.1	28.1	-0.2%
Amount of Unemployment Compensation (thous. of dol.)	6,282.3	4,011.1	-36.2%	6,244.9	8,729.1	-28.5%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,470.4	2,434.0	-1.5%	2,368.4	2,432.9	-2.7%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	56,443.4	48,104.6	-14.8%	148,412.4	130,578.7	13.7%
Sales and Use Tax	13,085.4	8,609.3	-34.2%	50,728.6	46,931.6	8.1%
Motor Fuel Tax	2,417.3	879.5	-63.6%	10,651.8	7,984.2	33.4%
Individual Income Tax	24,384.0	17,810.8	-27.0%	52,724.9	45,131.5	16.8%
Corporation Franchise Tax	4,556.2	2,703.0	-40.7%	5,691.6	5,247.5	8.5%
Production						
Net Electric Power Utilized (mil. of kwh)	1,187.3	1,325.2	11.6%	1,196.0	1,125.0	6.3%
Crude Oil to Refineries (thous. of bbls.)	4,065.0	4,540.6	11.7%	3,965.8	3,920.3	1.2%
Crude Oil (thous. of bbls.)	3,023.9	2,764.5	-8.6%	2,873.1	3,027.5	-5.1%
Natural Gas (mil. of cu. ft.)	21,718.1	21,623.1	-0.4%	23,170.0	20,458.1	13.3%
Coal (thous. short tons)	1,250.0	1,336.0	6.9%	1,529.8	954.1	60.3%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	1,010,460	994,221	-1.6%	852,104	840,812	1.3%
Highway Traffic Count Across State Lines	51,815	NA	NA	NA	38,134	NA
Transient Room Taxes (thous. of dol.)	559.5	74.9	-86.6%	491.6	476.6	3.2%
Visits, State, Nat'l. Parks, Monuments (thous.)	2,242.0	2,338.8	4.3%	1,075.3	1,027.5	4.6%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	477,566	486,273	1.8%	484,900	476,966	1.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	175,914	181,044	2.9%	178,767	172,864	3.4%
Electric Customers (Residential)	469,772	471,233	0.3%	475,864	468,172	1.6%
Electric Customers (Commercial)	46,201	46,911	1.5%	46,473	45,977	1.1%
Natural Gas Customers (Residential & Commercial)	442,329	456,191	3.1%	453,897	442,368	2.6%
Natural Gas Customers (Industrial)	557	546	-2.0%	547	562	-2.6%

Utah Business Statistics

UTAH DATA	July 1987	July 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.5r	52.9fo	0.8%	52.2	52.6	-0.8%
Unemployment Rate	5.4r	4.1	-24.1%	4.8	5.2	-8.1%
Auth. Permit Construction (thous. of dol.)	9,364.5	9,429.5	0.7%	10,057.9	14,291.8	-29.6%
New Dwelling Units (no.)	87	62	-28.7%	73	130	-43.6%
Postal Receipts (thous. of dol.)	310.7	391.2	25.9%	379.8	NA	NA
Electric Customers (Residential)	47,374	48,041	1.4%	47,848	46,551	2.8%
Electric Customers (Commercial)	3,285	3,659	11.4%	3,375	3,258	3.6%
Natural Gas Customers (Residential)	48,585	50,247	3.4%	49,722	47,966	3.7%
Natural Gas Customers (Industrial)	52	53	1.9%	52	52	0.5%
Telephone Lines in Service (Mt. Bell)(Residential)	55,189	55,363	0.3%	54,995	54,326	1.2%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,663	11,399	6.9%	10,990	10,364	6.0%
Salt Lake County						
Non-Ag. Employment (thous.)	330.7r	335.4fo	1.4%	336.0	332.2	1.1%
Unemployment Rate	5.3r	4.3	-18.9%	5.1	5.5	-7.5%
Auth. Permit Construction (thous. of dol.)	44,939.8	25,253.0	-43.8%	34,386.4	47,952.2	-28.3%
New Dwelling Units (no.)	216	180	-16.7%	177	328	-46.1%
Postal Receipts (thous. of dol.)	6,222.3	7,718.7	24.0%	7,745.4	7,049.7	9.9%
Electric Customers (Residential)	235,524	238,592	1.3%	238,362	234,536	1.6%
Electric Customers (Commercial)	19,981	20,317	1.7%	20,224	19,695	2.7%
Natural Gas Customers (Residential)	215,558	219,329	1.7%	219,119	215,829	1.5%
Natural Gas Customers (Industrial)	240	236	-1.7%	235	248	-5.3%
Telephone Lines in Service (Mt. Bell)(Residential)	226,175	229,635	1.5%	228,847	225,283	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,001	111,235	1.1%	110,473	109,137	1.2%
Utah County						
Non-Ag. Employment (thous.)	71.9r	74.3fo	3.3%	75.1	72.7	3.3%
Unemployment Rate	6.4r	4.0	-37.5%	5.2	7.4	-29.2%
Auth. Permit Construction (thous. of dol.)	15,164.1	10,537.5	-30.5%	10,784.2	11,446.6	-5.8%
New Dwelling Units (no.)	113	67	-40.7%	66	96	-31.8%
Postal Receipts (thous. of dol.)	798.3	1,228.4	53.9%	1,045.9	928.1	12.7%
Electric Customers (Residential)	50,451	51,912	2.9%	52,987	50,356	5.2%
Electric Customers (Commercial)	6,275	6,009	-4.2%	6,003	6,334	-5.2%
Natural Gas Customers (Residential)	59,342	61,183	3.1%	61,147	60,040	1.8%
Natural Gas Customers (Industrial)	68	65	-4.4%	68	69	-1.8%
Telephone Lines in Service (Mt. Bell)(Residential)	61,027	63,612	4.2%	63,845	62,378	2.4%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	18,534	19,836	7.0%	19,526	17,508	11.5%
Weber County						
Non-Ag. Employment (thous.)	60.5r	60.9fo	0.7%	60.8	60.3	0.8%
Unemployment Rate	7.7r	4.9	-36.4%	6.2	6.9	-9.7%
Auth. Permit Construction (thous. of dol.)	8,451.8	4,715.5	-44.2%	7,157.3	9,228.4	-22.4%
New Dwelling Units (no.)	106	41	-61.3%	52	75	-30.1%
Postal Receipts (thous. of dol.)	530.9	618.9	16.6%	636.8	622.6	2.3%
Electric Customers (Residential)	52,736	53,404	1.3%	53,275	52,471	1.5%
Electric Customers (Commercial)	4,822	4,912	1.9%	4,904	4,795	2.3%
Natural Gas Customers (Residential)	48,564	49,553	2.0%	49,418	48,725	1.4%
Natural Gas Customers (Industrial)	86	82	-4.7%	84	85	-2.0%
Telephone Lines in Service (Mt. Bell)(Residential)	45,987	46,538	1.2%	46,207	45,734	1.0%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,026	12,007	8.9%	11,519	10,751	7.1%

r Revised   fo Forecast   Na Not Available

Sources:

Personal Income:	Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations:	Utah Secretary of State.
New Car and Truck Sales:	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture:	U.S. Department of Agriculture, Agriculture, Utah: Utah Crop and Livestock Reporting Service.
Construction Data:	F.W. Dodge Statistics and Utah Construction Report, Bureau of Economic and Business Research.
Employment Data:	Utah Department of Employment Security.
Savings Information:	Utah Savings and Loan Institutions.
Tax Collections:	Utah State Tax Commission.
Net Electric Power Utilized:	Cooperating Utah power companies
Crude Oil Production:	Area oil refineries.
Natural Gas Production:	Utah Department of Oil, Gas, and Mining.
Coal Production:	U.S. Department of Energy.
Air Passengers:	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count:	Utah Department of Transportation.
Visits to State and National Parks and Monuments:	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data:	Cooperating Utah utility companies.
Postal Receipts:	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Footnotes:
1 Obtained from F.W. Dodge Statistics.
2 Obtained from Utah Construction Report.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

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NATIONAL DATA	July 1987	July 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,568.0	4,899.5	7.3%	4,721.4	4,387.2	7.6%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,778.6	4,071.3	7.7%	3,953.0	3,660.1	8.0%
Industrial Production Indexes (seasonally adjusted) (1977=100)	130.6	138.1	5.7%	134.3	126.9	5.8%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	393.1	440.4	12.0%	416.2	379.8	9.6%
Index of Leading Indicators (1967=100)	190.9	192.5	0.8%	191.7	185.6	3.2%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	113.8	118.5	4.1%	116.2	111.6	4.2%
CPI-U (All Urban Consumers) Food & Beverages	113.7	118.8	4.5%	115.8	111.9	3.4%
CPI-U (All Urban Consumers) Housing	114.7	119.1	3.8%	116.7	112.6	3.6%
CPI-U (All Urban Consumers) Transportation	106.0	109.8	3.6%	107.5	102.8	4.6%
CPI-U (All Urban Consumers) Medical Care	130.7	139.3	6.6%	135.0	127.0	6.3%
CPI-U (All Urban Consumers) Energy	91.1	91.4	0.3%	89.3	85.7	4.2%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	106.0	108.5	2.4%	106.6	104.2	2.3%
GNP Price Deflator (1982=100) (qtly.)	118.2	122.3	3.5%	119.7	116.1	3.1%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	119.9	121.6	1.4%	120.9	119.0	1.6%
Total Civilian Employment (mil.)	112.7	115.0	2.0%	114.0	111.2	2.5%
Unemployment Rate	6.0	5.4	-10.0%	5.7	6.6	-13.4%
Construction						
Total Construction (mil. of dol.)	24,567.3	21,379.4	-13.0%	20,646.7	20,450.2	1.0%
Residential	11,441.1	9,912.2	-13.4%	9,679.6	9,901.4	-2.2%
Nonresidential	8,552.5	7,594.9	-11.2%	7,064.0	6,910.2	2.2%
Non-Building	4,573.7	3,872.3	-15.3%	3,757.4	3,638.6	3.3%
New Dwelling Units (no.)	146,245	119,100	-18.6%	121,277	135,433	-10.5%
Interest Rates						
Short Term (3-month Treasury bill rate)	5.78	6.73	16.4%	6.09	5.53	10.1%
Long Term (30-year Treasury bond yields)	8.70	9.20	5.7%	8.78	8.06	9.0%
Prime Rates Charged by Banks on Short-term Business Loans (ave.)	8.25	9.29	12.6%	8.75	7.73	13.1%
Mortgage Rates (new homes)	9.01	8.80	-2.3%	8.81	9.21	-4.3%

Sources: Business Conditions Digest, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant and Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer price Indexes, Producer Price Index.

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1988 POPULATION ESTIMATES FOR UTAH AND ITS COUNTIES

Brad T. Barber and Jeanine M. Taylor*

The Population Estimates Committee has estimated that the population of Utah reached 1,695,000 as of July 1, 1988, which represents an increase of 15,000, or 0.9 percent over the 1987 revised estimate of 1,680,000. Utah's estimate includes the natural increase of 26,526 persons, and an implied net out-migration of over 11,000. The U.S. population increase was estimated to be 1.0 percent for the same period.

Natural increase, which is the measure of births minus deaths, was the lowest number since 1976. Although the number of births has dropped steadily for the past few years, fiscal year 1988 showed a slight increase of 0.5 percent. Deaths also increased by 3.5 percent, which resulted in the natural increase showing a slight decline.

Most of Utah's population increase occurred in three of the Wasatch Front Counties: Davis, Salt Lake and Utah. Davis County increased by 5,000, while both Salt Lake and Utah Counties increased by 4,000 persons. These three counties accounted for almost 90 percent of the total growth in the state. Although Washington County is still the most rapidly growing county in the state, its 4.1 percent growth for 1988 is the smallest in the last eight years.

This year was the fifth consecutive year of a cycle of net out-migration. The 1988 state rate of net out-migration is 0.7 percent, which means that 0.7 percent of the 1987 population left the state during the year. The rate of net out-migration was once again highest in Utah's rural counties, many of which were impacted by the further decline in energy development. These counties include Beaver, Carbon, Duchesne, Emery, Grand, Iron, Millard, Rich, San Juan, Tooele and Uintah. In fact, these counties, with the exception of San Juan, had net out-migration which exceeded natural increase, resulting in a decline in the total population.

The Population Estimates Committee has revised its 1987 state estimate in order to reach a consensus with the U.S. Bureau of the Census at the state level. This assures consistency between state total population estimates published by the Bureau of the Census and the Population Estimates Committee. However, the Committee's county estimates may still differ from those of the Census Bureau.

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Figure 1 presents the percentage changes in population for each of the counties from 1987 to 1988. Figure 2 displays the percent change in population by county for the period 1980-88, and Figure 3 presents net migration for the 1980-88 period as a percent of 1980 population. Table 1 offers the revised and preliminary population estimates by county, Multi-County Districts (MCD) and Metropolitan Statistical Areas (MSA) for 1980 through 1988. Table 2 presents total natural increase and total "residual" net migration by county for the 1980-88 period, along with the past two individual years. Table 3 offers births, deaths and natural increase for calendar and fiscal years 1970 through 1987-88, while Table 4 shows the population density for each county for 1980, 1987 and 1988. Table 5 presents the derivation of the Committee's preliminary July 1, 1988 estimates based upon the 1987 revised state population total.

Growth in the 1980's

The population estimate for Utah was 1,474,000 as of July 1, 1980. Since that time, the population has grown by approximately 221,000 persons, which translates into a 1.7 percent average annual growth rate for the 1980's. This rate compares to the national average annual growth rate of 1.0 percent for the 1980's, and makes Utah the ninth fastest growing state in the nation.

Population change over time is a result of two phenomena: 1) natural increase, or births minus deaths; and 2) net migration. As stated above, the total increase in population in the state for the 1980's has been due to natural increase; however, the following is a brief description of population change in the 1980's on the county level. These population changes, increases and decreases, are a result of adding natural increase plus net (either in or out) migration to the 1980 population base. Figure 2 displays the total percent changes in county population for the period 1980-88.

The first three years in the 1980's showed net in-migration, while the last five years have shown net out-migration. Natural increase totalled 238,359 for the past eight years. Given the population increase of 221,000, there is an implied "residual" net out-migration, over the past eight years, of over 17,000 persons. In other words, the residual of total population change minus natural increases equals net migration. Net out-migration occurs when the total observed change in population is smaller than the natural increase alone. Net inmigration occurs when the observed population change is greater than that measured by natural increase alone.

Although the four metropolitan counties -- Davis, Weber, Salt Lake and Utah -- accounted for over 75 percent of the population growth in the state in the last eight years, all of the increase was due to natural increase. The natural increase for the four counties was 186,228, while the increase in the population was 171,000. This implies a net out-migration of almost 16,000 persons for the four counties.

In terms of net migration, Washington, Davis, Millard, Cache and Summit Counties had net inmigration of over 1,000 persons for the eight-year period, while 11 counties had net out-migrations of over 1,000 persons for the same period. This does not necessarily mean that there is a net decrease in population; that will happen only if net out-migration is greater than the natural increase. Total net migration for the last eight years as a percent of the Census population count in 1980 is presented in Figure 3.

Organization and Procedure

Coordination and staffing of the Utah Population Estimates Committee is the responsibility of the Demographic and Economic Analysis (DEA) Section of the Utah State Office of Planning and Budget. The Committee's estimates represent the official estimate for the state and its counties. A listing of Committee members appears on the last page of this article.

The Committee's participation in the Federal-State Cooperative Program for Local Population Estimates provides not only for an exchange of data, but also provides for an opportunity to improve the quality of the state and county estimates by both parties.

Methodology for Estimating Population

For the past several years, the Utah Population Estimates Committee has utilized two population estimating methods -- school enrollment and L.D.S. Church membership -- in calculating its state and county estimates. At its November and December 1988 meetings, the Committee reviewed the population estimates derived from these two methods. Employment and new utility connection data were used as supplemental data to the estimates to assure consistency.

School Enrollment Method

The school enrollment method utilizes data from fall 1988 school enrollment changes as an indicator of net migration, along with fiscal year 1988 birth and death records as a measure of natural increase. The Utah Population Estimates Committee, like the Bureau of the Census, relies heavily upon school enrollment data as an indicator of migration. Since the state does not collect migration statistics, it is important to note that these migration numbers are derived estimates -- not an actual count.

The school enrollment method compares a county's survived enrollment (calculated by applying survival rates to the enrollment count) in grades 1-8 for October 1987, to grades 2-9 for October 1988. The difference between these two enrollment totals is taken to be net student migration for the county. Total net migration for the county is then derived by multiplying the county's student migration estimate by the county- specific total population-to-student ratio. This ratio is defined as the total population estimate of the county for 1987 divided by the 1987 grades 1-8 school enrollment.

The second component of the school enrollment method is the calculation of natural increase in the county. Natural increase for any year is defined as the number of births minus the number of deaths. The 1988 population estimates are determined, in part, by the number of resident births and deaths that occurred from July 1, 1987 to June 30, 1988. The count of births and deaths occurring to Utah residents for the fiscal year 1988 can be found in Table 3.

Births in fiscal year 1988 were 35,648, a slight increase from 1987, but still the second lowest number of births since 1976. The crude birth rate (births during the calendar year per 1,000 population on July 1) has dropped from 28.3 in 1980 to 21.0 in 1987, while the U.S. crude birth rate held virtually constant: 15.9 in 1980 and 15.7 in 1987.

The total number of deaths, with few reversals, has increased each year since 1980. However, deaths per 1,000 population have stayed fairly constant -- 5.5 per 1,000 population in 1980 and 5.4 per 1,000 population in 1987.

The school enrollment method is limited in estimating migration among the retired, college students, single persons and other groups that are not represented in school enrollment estimates.

L.D.S. Membership Method

The L.D.S. Church annually audits its records and enumerates the members residing in each county of the state. The Committee uses this information to produce a set of county-level population estimates. The L.D.S. membership method uses a total population to L.D.S. membership ratio which is obtained by dividing 1987's population by the 1987 L.D.S. membership. This ratio is applied to the current L.D.S. membership to obtain a county population estimate. This method is relatively accurate in areas with high proportions of L.D.S. membership and low migration rates.

Local Coordination

At the Committee's December 1988 meeting, the preliminary 1988 county and state population estimates were reviewed and approved. The respective county estimates were then sent to each county commission and to the seven Associations of Government for review and comment. Several issues have been raised as a result of these communications throughout the state and investigation will follow.

The local coordination effort is an important component of the estimation process. Although there will always be small differences between the Committee's estimates and estimates developed by local governments, it does assure the Committee that no major problems exist. The Committee is dedicated to keeping local governments informed of changes in estimation data and procedures.

Table 1
Population Estimates by County, MCD and MSA

County	7/1/80	7/1/81[a]	7/1/82[a]	7/1/83	7/1/84[a]	7/1/85	7/1/86[a]	7/1/87[a]	7/1/88[b]	1980-88 Growth (percent)
Beaver	4,400	4,600	4,650	5,000	5,150	5,050	4,950	4,900	4,800	9.09
Box Elder	33,500	34,000	34,700	35,300	35,800	36,600	37,300	37,800	38,000	13.43
Cache	57,700	59,800	62,000	64,500	65,600	66,700	67,800	69,200	70,600	22.36
Carbon	22,400	23,100	24,700	24,500	23,700	23,400	23,000	22,500	22,000	-1.79
Daggett	750	850	850	750	750	700	700	700	700	-6.67
Davis	148,000	153,000	158,000	162,000	166,000	170,000	175,000	179,000	184,000	24.32
Duchesne	12,700	13,100	13,700	14,400	14,800	14,700	14,300	13,700	13,100	3.15
Emery	11,600	12,100	13,000	13,100	12,400	11,800	11,800	11,600	11,300	-2.59
Garfield	3,700	3,700	3,750	3,950	3,950	4,050	4,050	4,050	4,050	9.46
Grand	8,250	8,400	8,100	7,950	7,650	7,050	6,850	6,700	6,550	-20.61
Iron	17,500	17,900	18,300	18,900	19,300	19,400	19,500	19,500	19,200	9.71
Juab	5,550	5,600	5,700	5,900	6,150	6,250	5,800	5,700	5,700	2.70
Kane	4,050	4,050	4,150	4,350	4,500	4,700	4,800	4,850	4,900	20.99
Millard	9,050	9,600	10,400	11,400	13,500	14,200	13,600	13,000	12,900	42.54
Morgan	4,950	5,050	5,200	5,250	5,350	5,450	5,500	5,650	5,700	15.15
Piute	1,350	1,400	1,350	1,450	1,500	1,550	1,550	1,550	1,550	14.81
Rich	2,150	2,250	2,400	2,300	2,150	2,100	2,050	1,950	1,850	-13.95
Salt Lake	625,000	640,000	655,000	667,000	679,000	689,000	697,000	701,000	705,000	12.80
San Juan	12,400	12,700	12,600	13,000	12,800	12,500	12,700	12,900	12,900	4.03
Sanpete	14,800	15,400	16,100	16,900	17,000	16,900	16,500	16,600	16,700	12.84
Sevier	14,900	15,200	15,500	15,800	16,100	16,200	15,800	15,900	15,900	6.71
Summit	10,400	10,900	11,300	11,800	12,200	12,400	12,700	13,300	13,400	28.85
Tooele	26,200	26,800	27,100	27,300	28,200	28,300	28,100	28,100	27,800	6.11
Uintah	20,700	21,900	24,300	25,300	24,500	24,000	23,000	21,800	21,500	3.86
Utah	220,000	228,000	235,000	242,000	247,000	250,000	253,000	258,000	262,000	19.09
Wasatch	8,650	8,900	8,750	9,050	9,200	9,200	9,450	9,700	9,800	13.29
Washington	26,400	27,700	29,400	30,700	32,600	35,700	39,100	41,300	43,000	62.88
Wayne	1,950	2,000	2,000	2,150	2,150	2,100	2,100	2,050	2,100	7.69
Weber	145,000	148,000	151,000	154,000	155,000	155,000	157,000	157,000	158,000	8.97
MCD										
Bear River	93,350	96,050	99,100	102,100	103,550	105,400	107,150	108,950	110,450	18.32
Wasatch Front	949,150	972,850	996,300	1,015,550	1,033,550	1,047,750	1,062,600	1,070,750	1,080,500	13.84
Mountainland	239,050	247,800	255,050	262,850	268,400	271,600	275,150	281,000	285,200	19.31
Central	47,600	49,200	51,050	53,600	56,400	57,200	55,350	54,800	54,850	15.23
Southwest	56,050	57,950	60,250	62,900	65,500	68,900	72,400	74,600	75,950	35.50
Uintah Basin	34,150	35,850	38,850	40,450	40,050	39,400	38,000	36,200	35,300	3.37
Southeast	54,650	56,300	58,400	58,550	56,550	54,750	54,350	53,700	52,750	-3.48
MSA										
Salt Lake-Ogden MSA	918,000	941,000	964,000	983,000	1,000,000	1,014,000	1,029,000	1,037,000	1,047,000	14.05
Provo MSA	220,000	228,000	235,000	242,000	247,000	250,000	253,000	258,000	262,000	19.09
State of Utah	1,474,000	1,516,000	1,559,000	1,596,000	1,624,000	1,645,000	1,665,000	1,680,000	1,695,000	14.99

[a] Revised
[b] Preliminary

Note: Historical state totals may vary slightly with Bureau of the Census estimates, due to recent revisions by the Census Bureau.

Table 2
Components of Change
1980-88, 1986-87 and 1987-88

	Total Natural Increase	1980 to 1988 Net Migration[a]	Revised 1986 to 1987 Natural Increase	Net Migration[a]	Preliminary 1987 to 1988 Natural Increase	Net Migration[a]
Beaver	457	(68)	41	(144)	30	(84)
Box Elder	4,943	(356)	532	(49)	548	(220)
Cache	11,290	1,657	1,242	285	1,298	137
Carbon	2,519	(2,830)	256	(739)	187	(672)
Daggett	105	(163)	8	(26)	9	14
Davis	26,007	9,600	3,159	991	3,239	756
Duchesne	2,489	(2,038)	248	(892)	199	(769)
Emery	2,018	(2,367)	159	(428)	138	(391)
Garfield	455	(115)	43	(12)	23	(39)
Grand	849	(2,570)	80	(237)	56	(217)
Iron	2,812	(1,055)	298	(333)	287	(552)
Juab	718	(593)	64	(192)	52	(44)
Kane	489	335	68	(41)	38	6
Millard	1,752	2,136	189	(829)	175	(152)
Morgan	611	112	78	87	49	(24)
Piute	59	167	5	(22)	(4)	45
Rich	359	(622)	21	(95)	26	(128)
Salt Lake	94,818	(13,801)	10,795	(7,451)	10,821	(6,123)
San Juan	1,923	(1,380)	184	23	220	(215)
Sanpete	1,822	167	140	(86)	167	33
Sevier	1,788	(663)	175	(33)	138	(94)
Summit	1,543	1,517	175	394	163	(40)
Tooele	3,260	(1,549)	366	(325)	310	(541)
Uintah	4,182	(3,368)	424	(1,679)	329	(523)
Utah	46,871	(5,423)	5,059	(304)	5,337	(1,545)
Wasatch	1,234	(105)	113	183	143	(87)
Washington	4,714	11,942	627	1,613	564	1,251
Wayne	240	(108)	27	(69)	14	25
Weber	18,532	(6,227)	2,080	(1,860)	1,970	(1,241)
State Total	238,859	(17,768)	26,656	(12,269)	26,526	(11,435)

[a] Based on unrounded population estimates.

Table 3
Resident Utah Births, Deaths and Natural Increase
Fiscal and Calendar Years 1970-1987/88

	Calendar Year (Year Ending 12/31)			Fiscal Year (Year Ending 6/30)		
Year	Births	Deaths	Natural Increase	Births	Deaths	Natural Increase
1970	26,969	7,063	19,906	25,601	6,927	18,674
1971	27,552	7,245	20,307	27,407	7,207	20,200
1972	26,911	7,323	19,588	27,146	7,236	19,910
1973	27,978	7,573	20,405	27,562	7,517	20,045
1974	29,946	7,380	22,566	28,876	7,496	21,380
1975	31,667	7,519	24,148	30,566	7,515	23,051
1976	35,310	7,472	27,838	33,773	7,378	26,395
1977	37,956	7,612	30,344	36,709	7,595	29,114
1978	38,811	7,871	30,940	38,265	7,687	30,578
1979	41,078	7,871	33,207	40,134	7,846	32,288
1980	41,786	8,103	33,683	41,591	8,108	33,483
1981	41,286	8,263	33,023	41,511	8,112	33,399
1982	41,537	8,502	33,035	41,774	8,404	33,370
1983	39,441	8,484	30,957	40,557	8,346	32,211
1984	38,286	8,944	29,342	38,643	8,886	29,757
1985	37,441	9,044	28,397	37,508	8,923	28,585
1986	36,383	8,886	27,497	37,145	8,790	28,355
1987	35,285	9,055	26,230	35,469	8,813	26,656
1988	na	na	na	35,648	9,122	26,526

na - Not available

Table 4
Utah Population Density by County
1980, 1987 and 1988

	Land Area		April 1, 1980 Population		July 1, 1987 Population		July 1, 1988 Population	
County	Square Miles	Square Kilometers	Count	Per Square Mile	Estimate[a]	Per Square Mile	Estimate[b]	Per Square Mile
Beaver	2,586	6,698	4,378	1.7	4,900	1.9	4,800	1.9
Box Elder	5,614	14,539	33,222	5.9	37,800	6.6	38,000	6.7
Cache	1,171	3,033	57,176	48.8	69,200	57.9	70,600	59.1
Carbon	1,479	3,831	22,179	15.0	22,500	15.6	22,000	15.1
Daggett	699	1,810	769	1.1	700	1.0	700	1.0
Davis	299	775	146,540	490.1	179,000	585.3	184,000	598.7
Duchesne	3,234	8,375	12,565	3.9	13,700	4.4	13,100	4.2
Emery	4,449	11,523	11,451	2.6	11,600	2.7	11,300	2.6
Garfield	5,148	13,333	3,673	0.7	4,050	0.8	4,050	0.8
Grand	3,689	9,554	8,241	2.2	6,700	1.9	6,550	1.8
Iron	3,302	8,551	17,349	5.3	19,500	5.9	19,200	5.9
Juab	3,396	8,796	5,530	1.6	5,700	1.7	5,700	1.7
Kane	3,898	10,095	4,024	1.0	4,850	1.2	4,900	1.2
Millard	6,818	17,659	8,970	1.3	13,000	2.0	12,900	1.9
Morgan	603	1,562	4,917	8.2	5,650	9.1	5,700	9.4
Piute	759	1,965	1,329	1.8	1,550	2.0	1,550	2.0
Rich	1,034	2,679	2,100	2.0	1,950	2.0	1,850	1.9
Salt Lake	756	1,959	619,066	818.9	701,000	922.0	705,000	925.9
San Juan	7,725	20,008	12,253	1.6	12,900	1.6	12,900	1.7
Sanpete	1,586	4,109	14,620	9.2	16,600	10.4	16,700	10.5
Sevier	1,910	4,946	14,727	7.7	15,900	8.3	15,900	8.3
Summit	1,865	4,831	10,198	5.5	13,300	6.8	13,400	7.1
Tooele	6,919	17,921	26,033	3.8	28,100	4.1	27,800	4.1
Uintah	4,479	11,600	20,506	4.6	21,800	5.1	21,500	4.9
Utah	2,018	5,226	218,106	108.1	258,000	125.4	262,000	127.4
Wasatch	1,191	3,084	8,523	7.2	9,700	7.9	9,800	8.1
Washington	2,422	6,272	26,065	10.8	41,300	16.1	43,000	17.0
Wayne	2,461	6,373	1,911	0.8	2,050	0.9	2,100	0.8
Weber	566	1,465	144,616	255.5	157,000	277.4	158,000	277.4
State Total	82,076	212,572	1,461,037	17.8	1,680,000	20.3	1,695,000	20.4

[a] Revised
[b] Preliminary

Table 5
Derivation of 1988 County Population Estimates

	Revised July 1, 1987 Population Estimates	Fall 1988 School Enrollment Method	1988 L.D.S. Membership Method	1988 Population Estimates Average	July 1, 1988 Preliminary Population Estimates	1987-88 Percentage Change
Beaver	4,900	4,813	4,761	4,787	4,800	-2.0
Box Elder	37,800	37,942	38,167	38,054	38,000	0.5
Cache	69,200	70,455	70,851	70,653	70,600	2.0
Carbon	22,500	22,029	22,056	22,043	22,000	-2.2
Daggett	700	766	647	706	700	0.0
Davis	179,000	183,734	183,273	183,504	184,000	2.8
Duchesne	13,700	13,132	13,103	13,117	13,100	-4.4
Emery	11,600	11,381	11,203	11,292	11,300	-2.6
Garfield	4,050	4,009	4,119	4,064	4,050	0.0
Grand	6,700	6,625	6,455	6,540	6,550	-2.2
Iron	19,500	18,970	19,444	19,207	19,200	-1.5
Juab	5,700	5,835	5,558	5,697	5,700	0.0
Kane	4,850	4,883	4,897	4,890	4,900	1.0
Millard	13,000	12,758	13,105	12,931	12,900	-0.8
Morgan	5,650	5,600	5,771	5,686	5,700	0.9
Piute	1,550	1,619	1,511	1,565	1,550	0.0
Rich	1,950	1,858	1,880	1,869	1,850	-5.1
Salt Lake	701,000	703,197	707,833	705,515	705,000	0.6
San Juan	12,900	13,096	12,752	12,924	12,900	0.0
Sanpete	16,600	16,785	16,698	16,741	16,700	0.6
Sevier	15,900	15,992	15,990	15,991	15,900	0.0
Summit	13,300	13,647	13,186	13,417	13,400	0.8
Tooele	28,100	27,835	27,953	27,894	27,800	-1.1
Uintah	21,800	21,807	21,250	21,529	21,500	-1.4
Utah	258,000	261,078	262,567	261,823	262,000	1.6
Wasatch	9,700	9,585	9,980	9,782	9,800	1.0
Washington	41,300	42,980	43,219	43,100	43,000	4.1
Wayne	2,050	2,143	2,009	2,076	2,100	2.4
Weber	157,000	157,759	157,628	157,694	158,000	0.6
State Total	1,680,000	1,692,314	1,697,868	1,695,091	1,695,000	0.9

Population Estimates Committee

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Utah Division of Public
Utilities

Tom Williams
Utah State Tax
Commission

Figure 1
Percent Change In Population by County
July 1, 1987 to July 1, 1988

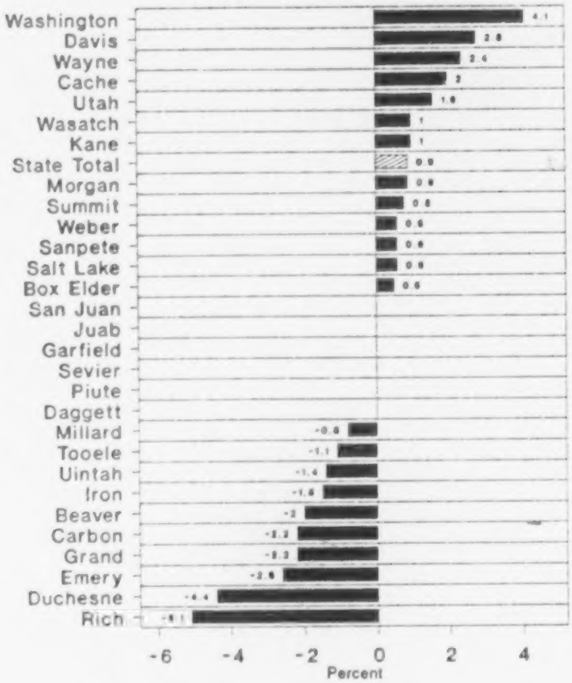


Figure 2
Percent Change In Population by County
July 1, 1980 to July 1, 1988

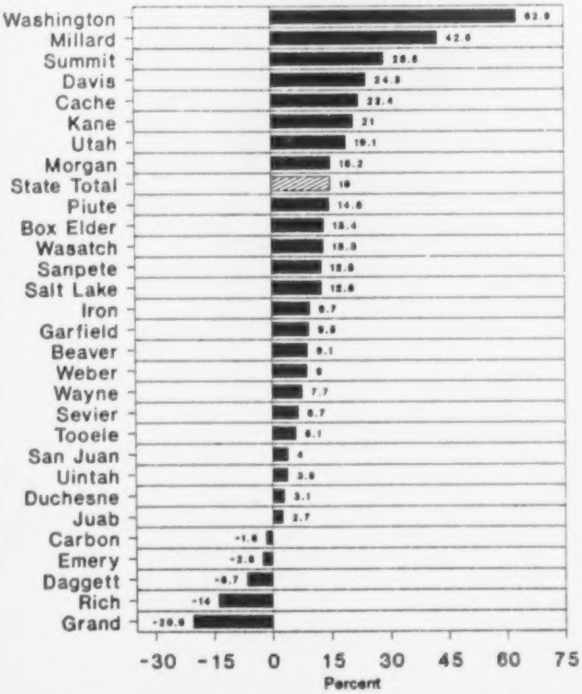
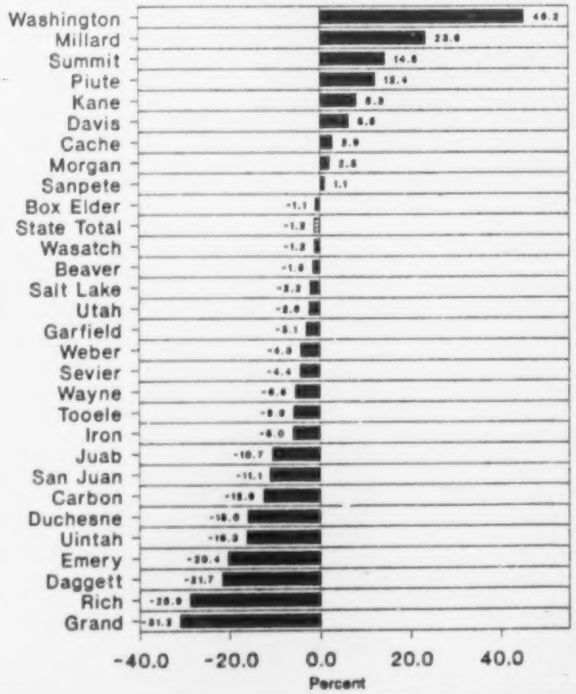


Figure 3
Net Migration from 1980 to 1988 as a
Percent of 1980 Population by County



Source: Utah Population Estimates Committee

Utah Business Statistics

UTAH DATA	August 1987	August 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,171	NA	NA	NA	18,635.0	NA
New Corporations (no.)	433	456	5.3%	471	450	4.8%
New Car, Truck and Motorhome Sales (no.)	5,657	NA	NA	NA	5,374	-19.1%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	64.10	67.00	4.5%	66.37	61.28	8.3%
Lambs (cwt)	72.30	54.30	-24.9%	66.63	71.34	-6.6%
Milk Wholesale (cwt)	11.70	11.20	-4.3%	11.55	12.06	-4.2%
Alfalfa Hay, Baled (per ton)	66.00	76.00	15.2%	73.17	64.83	12.9%
Cattle Slaughtered (live weight) (thous. of lbs.)	44,303	50,863	14.8%	45,758	40,271	13.6%
Construction						
Total Construction (thous. of dol.) 1	86,805	183,403	111.3%	123,796	123,387	0.3%
Residential	52,192	50,729	-2.8%	47,464	54,495	-12.9%
Nonresidential	26,205	53,142	102.8%	43,647	39,849	9.5%
Public Works and Utilities	8,408	79,532	845.9%	32,720	29,044	12.7%
Total Permit Construction (thous. of dol.) 2	100,335.2	84,059.7	-16.2%	75,535.6	96,386.7	-21.6%
Residential	45,583.1	39,597.1	-13.1%	34,218.4	48,071.2	-28.8%
Nonresidential	28,906.1	25,244.5	-12.7%	27,771.4	34,763.0	-20.1%
Additions, Alterations and Repairs	25,846.0	19,218.1	-25.6%	13,546.5	13,552.5	-0.0%
New Dwelling Units (no.)	656	533	-18.8%	476	752	-36.6%
Employment						
Civilian Labor Force (thous.)	755.5	747.3	-1.1%	754.5	757.7	-0.4%
Total Employed Persons	710.7	715.0	0.6%	713.9	709.4	0.6%
Unemployed Persons	44.8	32.3	-27.9%	40.7	48.3	-15.7%
Percent Total Labor Force	5.9	4.3	-27.1%	5.4	6.4	-15.7%
Employees on Nonagricultural Payrolls (thous. of jobs)	638.4	655.3	2.6%	648.1	637.4	1.7%
Manufacturing	93.6	98.6	5.3%	95.4	91.0	4.8%
Mining	8.0	8.5	6.3%	8.3	7.8	6.6%
Contract Construction	28.7	26.3	-8.4%	24.5	28.5	-13.9%
Transportaion, Communication and Utilities	38.0	39.4	3.7%	38.5	37.5	2.6%
Wholesale Trade	34.8	34.7	-0.3%	34.9	35.2	-1.0%
Retail Trade	118.6	120.8	1.9%	118.3	117.8	0.4%
Finance, Insurance and Real Estate	34.4	34.0	-1.2%	33.7	33.6	0.4%
Services 3	149.8	158.8	6.0%	152.7	143.8	6.2%
Federal Government	39.8	39.5	-0.8%	39.4	40.1	-1.8%
State Government 4	35.5	36.5	2.8%	37.7	37.9	-0.5%
Local Government 4	57.1	58.2	1.9%	64.5	63.7	1.3%
Average Weekly Hours						
Manufacturing	39.7	40.8	2.8%	40.4	39.5	2.3%
Mining	40.1	41.9	4.5%	42.7	41.3	3.5%
Wholesale Trade	37.4	36.7	-1.9%	38.0	37.6	1.0%
Retail Trade	28.7	29.0	1.0%	28.1	28.1	-0.0%
Amount of Unemployment Compensation (thous. of dol.)	5,654.1	5,018.4	-11.2%	6,191.9	8,678.0	-28.6%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,453.0	2,401.0	-2.1%	2,364.1	2,437.7	-3.0%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	200,943.8	203,069.6	1.1%	148,589.6	132,395.1	12.2%
Sales and Use Tax	71,894.1	87,776.3	22.1%	52,052.1	47,152.9	10.4%
Motor Fuel Tax	9,056.5	11,894.4	31.3%	10,888.3	8,078.0	34.8%
Individual Income Tax	82,248.2	63,477.3	-22.8%	51,160.6	46,567.1	9.9%
Corporation Franchise Tax	1,503.2	878.2	-41.6%	5,639.5	5,237.7	7.7%
Production						
Net Electric Power Utilized (mil. of kwh)	1,223.0	1,334.9	9.1%	1,205.3	1,126.4	7.0%
Crude Oil to Refineries (thous. of bbls.)	3,874.5	4,722.2	21.9%	4,036.4	3,906.1	3.3%
Crude Oil (thous. of bbls.)	2,902.0	2,762.8	-4.8%	2,861.5	3,006.3	-4.8%
Natural Gas (mil. of cu. ft.)	19,933.4	22,428.3	12.5%	23,377.9	20,557.6	13.7%
Coal (thous. short tons)	1,501.0	1,636.0	9.0%	1,541.0	1,002.6	53.7%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	1,017,714	1,060,054	4.2%	855,633	842,472	1.6%
Highway Traffic Count Across State Lines	51,569	NA	NA	NA	37,981.0	NA
Transient Room Taxes (thous. of dol.)	263.6	1,099.2	317.0%	561.3	439.4	27.7%
Visits, State, Nat'l. Parks, Monuments (thous.)	2,113.9	2,275.4	7.6%	1,088.7	1,028.5	5.9%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	478,165	486,884	1.8%	485,626	477,692	1.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	176,545	181,606	2.9%	179,189	173,536	3.3%
Electric Customers (Residential)	476,689	476,380	-0.1%	475,838	469,704	1.3%
Electric Customers (Commercial)	46,082	47,115	2.2%	46,559	46,023	1.2%
Natural Gas Customers (Residential & Commercial)	441,846	454,906	3.0%	454,986	443,328	2.6%
Natural Gas Customers (Industrial)	550	552	0.4%	548	560	-2.2%

Utah Business Statistics

UTAH DATA	August 1987	August 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.7r	53.1fo	0.8%	52.2	52.5	-0.5%
Unemployment Rate	5.2r	4.2	-19.2%	4.7	5.3	-10.8%
Auth. Permit Construction (thous. of dol.)	14,995.8	13,008.0	-13.3%	9,892.2	13,580.2	-27.2%
New Dwelling Units (no.)	113	83	-26.5%	71	107	-33.9%
Postal Receipts (thous. of dol.)	301.0	408.4	35.7%	388.7	NA	NA
Electric Customers (Residential)	47,162	48,230	2.3%	47,937	46,713	2.6%
Electric Customers (Commercial)	3,238	3,491	7.8%	3,396	3,250	4.5%
Natural Gas Customers (Residential)	48,483	50,076	3.3%	49,855	48,165	3.5%
Natural Gas Customers (Industrial)	52	53	1.9%	52	52	0.5%
Telephone Lines in Service (Mt. Bell)(Residential)	55,382	55,489	0.2%	55,004	54,491	0.9%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,707	11,454	7.0%	11,052	10,405	6.2%
Salt Lake County						
Non-Ag. Employment (thous.)	332.7r	339.4fo	2.0%	336.6	332.4	1.2%
Unemployment Rate	5.1r	4.0	-21.6%	5.0	5.5	-9.6%
Auth. Permit Construction (thous. of dol.)	40,130.1	36,834.2	-8.2%	34,111.8	45,876.4	-25.6%
New Dwelling Units (no.)	208	200	-3.8%	176	307	-42.6%
Postal Receipts (thous. of dol.)	6,449.8	8,136.4	26.1%	7,885.9	7,017.0	12.4%
Electric Customers (Residential)	235,258	238,619	1.4%	238,642	234,962	1.6%
Electric Customers (Commercial)	19,804	20,507	3.5%	20,282	19,729	2.8%
Natural Gas Customers (Residential)	214,247	218,491	2.0%	219,473	216,184	1.5%
Natural Gas Customers (Industrial)	235	241	2.6%	235	246	-4.4%
Telephone Lines in Service (Mt. Bell)(Residential)	226,538	229,880	1.5%	229,126	225,605	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,396	111,551	1.0%	110,569	109,344	1.1%
Utah County						
Non-Ag. Employment (thous.)	72.6r	75.5fo	4.0%	75.4	73.0	3.3%
Unemployment Rate	6.6r	3.8	-42.4%	5.0	7.4	-32.1%
Auth. Permit Construction (thous. of dol.)	13,350.0	11,053.7	-17.2%	10,592.9	12,034.1	-12.0%
New Dwelling Units (no.)	79	82	3.8%	66	98	-32.7%
Postal Receipts (thous. of dol.)	839.0	1,228.7	46.4%	1,078.4	928.3	16.2%
Electric Customers (Residential)	57,761	53,398	-7.6%	52,623	51,000	3.2%
Electric Customers (Commercial)	6,363	6,019	-5.4%	5,974	6,341	-5.8%
Natural Gas Customers (Residential)	59,799	61,404	2.7%	61,280	60,113	1.9%
Natural Gas Customers (Industrial)	68	68	0.0%	68	69	-1.2%
Telephone Lines in Service (Mt. Bell)(Residential)	61,048	63,623	4.2%	64,059	62,467	2.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	18,591	19,927	7.2%	19,637	17,729	10.8%
Weber County						
Non-Ag. Employment (thous.)	60.5	61.4	1.5%	60.9	60.3	1.0%
Unemployment Rate	6.8	5.1	-25.0%	6.1	7.0	-12.8%
Auth. Permit Construction (thous. of dol.)	15,691.9	6,182.5	-60.6%	6,364.9	8,887.6	-28.4%
New Dwelling Units (no.)	96	62	-35.4%	49.4	75.1	-34.2%
Postal Receipts (thous. of dol.)	572.3	607.6	6.2%	639.7	619.1	3.3%
Electric Customers (Residential)	52,740	53,428	1.3%	53,332.5	52,549.7	1.5%
Electric Customers (Commercial)	4,863	4,972	2.2%	4,913.4	4,805.1	2.3%
Natural Gas Customers (Residential)	48,387	49,784	2.9%	49,533.9	48,801.8	1.5%
Natural Gas Customers (Industrial)	85	82	-3.5%	83.5	85.3	-2.1%
Telephone Lines in Service (Mt. Bell)(Residential)	45,983	46,560	1.3%	46,254.7	45,770.7	1.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,109	12,034	8.3%	11,596.4	10,791.8	7.5%

r Revised fo Forecast Na Not Available

Sources:

Personal Income:	Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations:	Utah Secretary of State.
New Car and Truck Sales:	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture:	U.S. Department of Agriculture, Agriculture, Utah: Utah Crop and Livestock Reporting Service.
Construction Data:	F.W. Dodge Statistics and Utah Construction Report, Bureau of Economic and Business Research.
Employment Data:	Utah Department of Employment Security.
Savings Information:	Utah Savings and Loan Institutions.
Tax Collections:	Utah State Tax Commission.
Net Electric Power Utilized:	Cooperating Utah power companies
Crude Oil Production:	Area oil refineries.
Natural Gas Production:	Utah Department of Oil, Gas, and Mining.
Coal Production:	U.S. Department of Energy.
Air Passengers:	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count:	Utah Department of Transportation.
Visits to State and National Parks and Monuments:	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data:	Cooperating Utah utility companies.
Postal Receipts:	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Footnotes:

1 Obtained from F.W. Dodge Statistics.
2 Obtained from Utah Construction Report.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

Utah Business Statistics

UTAH DATA	Sept. 1987	Sept. 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,171	NA	NA	NA	18,704.3	NA
New Corporations (no.)	505	427	-15.4%	465	456	1.9%
New Car, Truck and Motorhome Sales (no.)	5,441	NA	NA	NA	5,122	-19.1%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	64.30	67.60	5.1%	66.64	61.93	7.6%
Lambs (cwt)	72.10	58.50	-18.9%	65.48	71.93	-9.0%
Milk Wholesale (cwt)	12.10	11.90	-1.7%	11.53	12.07	-4.4%
Alfalfa Hay, Baled (per ton)	72.00	77.00	6.9%	73.58	65.67	12.1%
Cattle Slaughtered (live weight) (thous. of lbs.)	44,540	46,200	3.7%	45,896	40,773	12.6%
Construction						
Total Construction (thous. of dol.) 1	114,301	77,678	-32.0%	120,744	121,088	-0.3%
Residential	49,601	46,588	-6.1%	47,213	53,677	-12.0%
Nonresidential	31,187	21,663	-30.5%	42,853	39,283	9.1%
Public Works and Utilities	33,504	9,427	-71.9%	30,713	28,127	9.2%
Total Permit Construction (thous. of dol.) 2	76,628.3	66,168.0	-13.7%	74,663.9	93,950.1	-20.5%
Residential	35,681.5	35,977.5	0.8%	34,243.1	45,760.0	-25.2%
Nonresidential	27,718.9	19,497.4	-29.7%	27,086.3	34,651.3	-21.8%
Additions, Alterations and Repairs	13,227.9	10,693.1	-19.2%	13,335.3	13,538.8	-1.5%
New Dwelling Units (no.)	509	496	-2.6%	475	704	-32.5%
Employment						
Civilian Labor Force (thous.)	757.4	757.4	0.0%	754.5	756.8	-0.3%
Total Employed Persons	715.5	725.7	1.4%	714.7	708.6	0.9%
Unemployed Persons	41.9	31.7	-24.3%	39.8	48.2	-17.5%
Percent Total Labor Force	5.5	4.2	-23.6%	5.3	6.4	-17.4%
Employees on Nonagricultural Payrolls (thous. of jobs)	650.0	670.2	3.1%	649.7	638.0	1.8%
Manufacturing	94.4	99.3	5.2%	95.8	91.3	5.0%
Mining	8.0	8.2	2.5%	8.3	7.9	6.2%
Contract Construction	28.8	27.5	-4.5%	24.4	28.0	-12.7%
Transportaion, Communication and Utilities	38.1	40.3	5.8%	38.7	37.6	2.9%
Wholesale Trade	36.6	34.9	-4.6%	34.7	35.2	-1.5%
Retail Trade	120.3	123.2	2.4%	118.6	117.9	0.5%
Finance, Insurance and Real Estate	33.9	33.3	-1.8%	33.7	33.7	0.1%
Services 3	148.6	162.2	9.2%	153.8	144.4	6.5%
Federal Government	39.6	39.4	-0.5%	39.4	40.0	-1.6%
State Government 4	36.3	36.3	0.0%	37.7	37.9	-0.5%
Local Government 4	65.5	65.6	0.2%	64.5	63.8	1.2%
Average Weekly Hours						
Manufacturing	40.0	41.0	2.5%	40.5	39.4	2.7%
Mining	40.9	41.0	0.2%	42.8	41.3	3.5%
Wholesale Trade	37.5	37.4	-0.3%	38.0	37.6	1.0%
Retail Trade	28.5	28.3	-0.7%	28.1	28.1	-0.1%
Amount of Unemployment Compensation (thous. of dol.)	5,663.6	4,023.7	-29.0%	6,055.3	8,598.3	-29.6%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,461.4	2,409.0	-2.1%	2,359.7	2,442.5	-3.4%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	74,290.9	29,842.7	-59.8%	144,885.6	133,891.0	8.2%
Sales and Use Tax	2,172.6	2,880.0	32.6%	52,111	46,958	11.0%
Motor Fuel Tax	13,100.9	12,576.5	-4.0%	10,844.6	8,533.3	27.1%
Individual Income Tax	37,799.9	46,307.2	22.5%	51,869.6	46,913.9	10.6%
Corporation Franchise Tax	8,020.6	11,938.3	48.8%	5,966.0	5,825.7	2.4%
Production						
Net Electric Power Utilized (mil. of kwh)	1,165.9	1,507.0	29.3%	1,233.8	1,135.4	8.7%
Crude Oil to Refineries (thous. of bbls.)	3,589.9	NA	NA	NA	3,869.0	NA
Crude Oil (thous. of bbls.)	2,955.1	2,637.7	-10.7%	2,835.1	3,007.3	-5.7%
Natural Gas (mil. of cu. ft.)	22,337.8	21,525.6	-3.6%	23,310.2	20,923.5	11.4%
Coal (thous. short tons)	1,538.0	1,467.0	-4.6%	1,535.1	1,057.8	45.1%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	773,696	814,460	5.3%	859,030	842,618	1.9%
Highway Traffic Count Across State Lines	43,296	NA	NA	NA	38,071	NA
Transient Room Taxes (thous. of dol.)	32.2	35	8.7%	561	454	23.6%
Visits, State, Nat'l. Parks, Monuments (thous.)	1,482.9	1,523.1	2.7%	1,092.1	1,049.7	4.0%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	480,810	489,914.0	1.9%	486,385.1	478,202.2	1.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	177,268	183,005.0	3.2%	179,667.0	174,166.0	3.2%
Electric Customers (Residential)	479,247	476,227.0	-0.6%	475,586.1	471,057.6	1.0%
Electric Customers (Commercial)	46,357	46,940.0	1.3%	46,607.5	46,073.5	1.2%
Natural Gas Customers (Residential & Commercial)	441,800	455,778.0	3.2%	456,150.6	444,328.4	2.7%
Natural Gas Customers (Industrial)	551	552.0	0.2%	547.7	558.1	-1.9%

Utah Business Statistics

UTAH DATA	Sept. 1987	Sept. 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.6	53.7fo	2.1%	52.3	52.4	-0.2%
Unemployment Rate	5.0	4.0	-20.0%	4.6	5.4	-13.5%
Auth. Permit Construction (thous. of dol.)	12,051.9	6,860.4	-43.1%	9,459.6	13,319.2	-29.0%
New Dwelling Units (no.)	79.0	60.0	-24.1%	69.2	101.9	-32.1%
Postal Receipts (thous. of dol.)	318.2	417.5	31.2%	397.0	NA	NA
Electric Customers (Residential)	47,516	48,172	1.4%	47,992	46,889	2.4%
Electric Customers (Commercial)	3,271	3,477	6.3%	3,413	3,256	4.8%
Natural Gas Customers (Residential)	48,535	50,278	3.6%	50,000	48,361	3.4%
Natural Gas Customers (Industrial)	50	53	6.0%	52	52	1.3%
Telephone Lines in Service (Mt. Bell)(Residential)	55,547	55,683	0.2%	55,016	54,652	0.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,712	11,516	7.5%	11,119	10,439	6.5%
Salt Lake County						
Non-Ag. Employment (thous.)	336.6	343.5fo	[illegible]	337.1	332.6	1.4%
Unemployment Rate	5.1	4.0	-21.6%	4.9	5.5	-11.6%
Auth. Permit Construction (thous. of dol.)	32,058.4	28,217.2	-12.0%	33,791.7	44,758.9	-24.5%
New Dwelling Units (no.)	186	224	20.4%	179	285	-37.2%
Postal Receipts (thous. of dol.)	9,043.2	7995.9	-11.6%	7,798.6	7,219.4	8.0%
Electric Customers (Residential)	235,772	239,007	1.4%	238,912	235,375	1.5%
Electric Customers (Commercial)	19,966	20,405	2.2%	20,319	19,783	2.7%
Natural Gas Customers (Residential)	214,225	218,524	2.0%	219,831	216,605	1.5%
Natural Gas Customers (Industrial)	235	239	1.7%	235	244	-3.6%
Telephone Lines in Service (Mt. Bell)(Residential)	227,223	230,838	1.6%	229,427	225,907	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,514	111,679	1.1%	110,667	109,506	1.1%
Utah County						
Non-Ag. Employment (thous.)	76.5	80.5fo	5.2%	75.7	73.2	3.4%
Unemployment Rate	5.9	3.6	-39.0%	4.8	7.3	-33.9%
Auth. Permit Construction (thous. of dol.)	8,996.7	8,836.6	-1.8%	10,579.5	12,152.8	-12.9%
New Dwelling Units (no.)	58	72	24.1%	67	97	-30.7%
Postal Receipts (thous. of dol.)	866.4	1,194.9	37.9%	1,105.8	929.7	18.9%
Electric Customers (Residential)	59,463	52,986	-10.9%	52,083	51,705	0.7%
Electric Customers (Commercial)	6,398	6,019	-5.9%	5,943	6,365	-6.6%
Natural Gas Customers (Residential)	59,804	61,388	2.6%	61,412	60,173	2.1%
Natural Gas Customers (Industrial)	69	67	-2.9%	68	69	-1.1%
Telephone Lines in Service (Mt. Bell)(Residential)	62,837	65,409	4.1%	64,274	62,364	3.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,055	20,863	9.5%	19,788	17,977	10.1%
Weber County						
Non-Ag. Employment (thous.)	59.7	60.6fo	1.5%	61.0	60.3	1.2%
Unemployment Rate	6.2	4.7	-24.2%	6.0	7.0	-15.0%
Auth. Permit Construction (thous. of dol.)	7,921.8	3,973.1	-49.8%	6,035.8	8,365.0	-27.8%
New Dwelling Units (no.)	57	38	-33.3%	48	71	-32.4%
Postal Receipts (thous. of dol.)	596.7	739.0	23.8%	651.6	618.7	5.3%
Electric Customers (Residential)	52,730	53,394	1.3%	53,388	52,629	1.4%
Electric Customers (Commercial)	4,866	4,983	2.4%	4,923	4,815	2.2%
Natural Gas Customers (Residential)	48,246	49,327	2.2%	49,624	48,855	1.6%
Natural Gas Customers (Industrial)	85	83	-2.4%	83	85	-2.1%
Telephone Lines in Service (Mt. Bell)(Residential)	45,952	46,630	1.5%	46,311	45,816	1.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,194	12,122	8.3%	11,674	10,845	7.6%

r Revised fo Forecast Na Not Available

Sources:

Personal Income:	Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations:	Utah Secretary of State.
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Footnotes:

1 Obtained from F.W. Dodge Statistics.

2 Obtained from Utah Construction Report.

3 Includes services by nonprofit and religious organizations.

4 Includes public schools and college institutions.

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NATIONAL DATA	Sept. 1987	Sept. 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,568.0	4,899.5	7.3%	4,776.6	4,437.2	7.7%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,820.8	4,112.9	7.6%	4,001.4	3,703.2	8.1%
Industrial Production Indexes (seasonally adjusted) (1977=100)	131.0	138.7	5.9%	135.5	128.0	5.9%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	393.1	440.4	12.0%	424.1	382.7	10.8%
Index of Leading Indicators (1967=100)	191.9	192.9	0.5%	191.9	187.6	2.3%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	115.0	119.8	4.2%	117.0	112.4	4.1%
CPI-U (All Urban Consumers) Food & Beverages	114.2	120.1	5.2%	116.7	112.6	3.7%
CPI-U (All Urban Consumers) Housing	115.6	119.9	3.7%	117.4	113.2	3.7%
CPI-U (All Urban Consumers) Transportation	106.6	109.7	2.9%	108.0	103.8	4.0%
CPI-U (All Urban Consumers) Medical Care	131.9	140.4	6.4%	136.4	128.3	6.3%
CPI-U (All Urban Consumers) Energy	92.3	91.9	-0.4%	89.2	86.8	2.7%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	105.7	108.6	2.7%	107.1	104.7	2.2%
GNP Price Deflator (1982=100) (qtly.)	118.2	122.4	3.6%	120.4	116.7	3.2%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	119.9	121.9	1.7%	121.2	119.3	1.5%
Total Civilian Employment (mil.)	112.7	115.3	2.3%	114.4	111.6	2.4%
Unemployment Rate	5.9	5.4	-8.5%	5.6	6.4	-12.5%
Construction						
Total Construction (mil. of dol.)	22,147.6	21,174.0	-4.4%	20,507.7	20,920.4	-2.0%
Residential	10,445.2	10,116.9	-3.1%	9,672.2	10,003.9	-3.3%
Nonresidential	8,174.5	7,523.8	-8.0%	7,004.4	7,157.3	-2.1%
Non-Building	3,797.9	3,533.3	-7.0%	3,662.8	3,781.7	-3.1%
New Dwelling Units (no.)	139,987	119,854	-14.4%	118,685	135,236	-12.2%
Interest Rates						
Short Term (3-month Treasury bill rate)	6.32	7.23	14.4%	6.25	5.66	10.4%
Long Term (30-year Treasury bond yields)	9.58	9.06	-5.4%	8.77	8.28	5.8%
Prime Rates Charged by Banks on Short-term Business Loans (ave.)	8.70	10.00	14.9%	8.99	7.86	14.3%
Mortgage Rates (new homes)	9.03	9.03	0.0%	8.79	9.08	-3.3%

Sources: Business Conditions Digest, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant and Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer price Indexes, Producer Price Index.

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FORECASTING UTAH'S INDUSTRIAL ELECTRICAL ENERGY REQUIREMENTS

Boyd L. Fjeldsted
Senior Research Economist

The University of Utah's Bureau of Economic and Business Research (BEBR) recently completed a project for the Utah Public Service Commission, involving the development of a capability for forecasting industrial electrical energy requirements in the State of Utah. The ostensible fruit of this effort was a set of forecasts of electrical energy requirements in Utah's manufacturing sectors out to the year 2010 (which are presented in Tables 1 and 2 below). But the actual numerical forecasts are of secondary importance to the realization of the modeling capability that was used to produce these forecasts. This capability was achieved through the implementation of a set of models known as the Industrial End-Use Planning Methodology (INDEPTH) econometric models.

INDEPTH Models

The INDEPTH econometric models were developed by Synergic Resources Corporation (SRC) as part of the Industrial End-Use Planning Methodology project sponsored by the Electric Power Research Institute. These models constitute a system designed to forecast industrial electricity consumption at the state or electrical utility service area level for each of the federal government's 2-digit Standard Industrial Classification (SIC) manufacturing sectors. There are a set of models for each of the 2-digit sectors, which have been derived upon the basis of cost-minimization assumptions. These models belong to a class of models that are referred to by SRC as KLEFM (capital, labor, electricity, fuels, materials). The notion is that industrial customers of electric utilities attempt to minimize the cost of producing any given level of output by adjusting the inputs of capital, labor, electricity, fuels and materials so as to achieve the least possible cost, given time and resource adjustment constraints.

Generally speaking, SRC estimated the parameters of four different models for each of the 2-digit manufacturing sectors using pooled time series and cross section data obtained from the Censuses of Manufactures and Annual Surveys of Manufactures. The four different models include the following forms: (1) Constant Elasticity of Substitution, (2) Static Translog, (3) Variable Cost Translog and (4) Variable Cost Generalized Leontief. Among the four different models SRC has expressed an industry specific starting recommendation for each of the 2-digit manufacturing sectors on the basis of statistical goodness of fit and how mathematically well behaved the parameterized model is. SRC suggests though, that other models be considered for a specific utility service area, because performance is partly a function of utility-specific price inputs.

For each of the different models the demand (or expenditure share) for each class of production input is modeled as a function of the prices of each of the production inputs. The Constant Elasticity of Substitution Model employs the simple CES form. The CES models are dynamic, in the sense of incorporating a lagged response to changes in energy prices, and are also globally optimal. The other three models incorporate a flexible functional form, meaning that certain technical optimizing conditions may not necessarily be satisfied by the estimated parameters. The Static Translog Model uses the translog functional form. It is a static model, and thus predicts an instantaneous response to changes in input prices. The two variable cost models are dynamic models. They treat capital as a quasi-fixed factor to model the dynamic responses of firms to change in input prices.

With certain exceptions, all four models require as inputs forecasts of real or inflation-adjusted values of the following exogenous variables:

- Price of electricity (mills per kwh)
- Price of natural gas ($ per million cubic feet)
- Price of oil ($ per barrel)
- Price of coal ($ per short ton)
- Average wage ($ per hour)
- Price of materials index
- Capital price index (static translog model only)
- Capital stock (variable cost models only)

Ideally, the forecasts of each of these variables should be 2-digit industry specific. However, it should be realized that it may not be practicable to differentiate several of the price variables on an industry-specific basis.

The Bureau of Economic and Business Research (BEBR) has implemented the INDEPTH Level 1 modeling system for at least one model form for each of the 2-digit manufacturing sectors in the State of Utah.

Exogenous variable forecasts except for the real price of electricity were undertaken by BEBR. The general nature of the future path of real electricity prices was suggested by Utah Power & Light. The remainder of the implementation effort involved assembling a historical time series for each of the model variables, and calibrating the model parameters to capture regional production function differences and to insure consistency of the model forecasts with historical service area industrial electricity usage. Calibration of the models took either of two forms: (1) estimation of an intercept term for each of the models, using service area specific data on total production cost and shares of total cost for each of the inputs in the base year; or (2) multiplicative calibration, which simply involves determination of a multiplicative constant, i.e., actual base year electricity consumption divided by predicted consumption. This latter calibration procedure calibrates forecasted electricity consumption directly, with elasticity parameters being unaffected.

BEBR has produced forecasts of industrial electrical energy consumption for the years 1986 through 2010 at the 2-digit level of detail for the State of Utah using both the Constant Elasticity of Substitution and Static Translog Models. Time and resource constraints prohibited the implementation of the Variable Cost Translog and Generalized Leontief Models.

Forecast Results

The forecast results are shown in Tables 1 and 2 below. Table 1 presents the forecasts of Utah manufacturing electrical energy consumption generated by the Static Translog Model, while Table 2 presents the forecasts of Utah manufacturing electrical energy consumption generated by the Constant Elasticity of Substitution model. It should be noted that tobacco manufacture in Utah is nil and that leather products manufacture is negligible, so that no forecasts have been made for these two sectors.

It should further be noted that SRC did not provide Constant Elasticity of Substitution Model parameter estimates for five sectors: furniture and fixtures; printing and publishing; chemicals; fabricated metal products; and machinery. Thus these five sectors are not represented in the Constant Elasticity of Substitution forecasts. For that same reason no manufacturing total electrical energy consumption numbers are included in the CES Model forecasts shown in Table 2.

Data Preparation

Historical estimates of the values of the exogenous variables were generated from several different data sources, including principally the 1982 Census of Manufactures and the Annual Surveys of Manufactures from 1981 through 1986. These data were supplemented with electricity price data calculated from revenue and kilowatt-hour data for Large Power Users (LPU) provided by Utah Power & Light Company and natural gas price data for industrial customers provided by Mountain Fuel Supply Company.

Industry specific price of electricity indices were calculated from the LPU data. This data series covered the years 1981-88 except for the textile and apparel

Table 1

Utah Static Translog Model
Electrical Energy Requirements Forecasts by Manufacturing Sector
[Millions of Kwh]

Year	Food Prod.	Tex-tiles	Clo-thing	Lumber Prod.	Furn-iture	Paper Prod.	Print. & Pub.	Chem-icals	Petrol. Prod.	Rubber Prod.	Stone Prod.	Prim. Metals	Metal Prod.	Mach-inery	Elect-ronics	Transp. Equip.	Instru-ments	Misc. Mfg.	Total
1986	135.3	2.6	38.3	25.9	16.0	58.4	53.7	879.3	425.9	21.9	546.4	687.8	63.2	267.5	216.4	242.7	58.3	19.0	5,744.3
1987	151.0	2.7	41.3	24.7	18.9	48.7	66.1	1124.0	447.5	24.3	526.3	675.9	70.1	304.6	236.3	258.0	59.4	20.9	6,087.8
1988	175.7	8.0	40.7	28.2	15.8	61.8	101.0	1376.0	482.2	25.9	518.4	1026.5	60.2	342.7	265.5	285.7	66.9	28.4	6,897.7
1989	183.5	8.1	41.4	28.5	16.1	62.5	103.3	1399.6	510.9	26.2	524.0	1040.9	61.1	393.0	268.1	289.7	75.6	29.0	7,050.4
1990	191.5	8.2	42.1	28.8	16.3	63.2	105.5	1423.5	540.2	26.5	529.5	1055.4	62.0	444.8	270.8	293.7	84.6	29.5	7,206.1
1991	199.7	8.3	42.8	29.1	16.6	63.9	107.9	1448.0	569.8	26.7	535.1	1070.2	62.9	498.0	273.4	297.8	93.8	30.1	7,365.1
1992	208.0	8.4	43.5	29.4	16.8	64.7	110.3	1472.7	599.9	27.0	540.7	1085.1	63.9	552.8	276.0	301.9	103.4	30.7	7,527.0
1993	216.5	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	630.4	27.3	546.3	1100.2	64.8	609.0	278.6	306.0	113.2	31.2	7,692.1
1994	222.1	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	655.6	27.3	546.3	1100.2	64.8	657.0	278.6	306.0	121.3	31.2	7,780.0
1995	227.8	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	680.8	27.3	546.3	1100.2	64.8	705.0	278.6	306.0	129.3	31.2	7,867.9
1996	233.4	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	706.1	27.3	546.3	1100.2	64.8	752.9	278.6	306.0	137.3	31.2	7,955.8
1997	239.1	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	731.3	27.3	546.3	1100.2	64.8	800.9	278.6	306.0	145.4	31.2	8,043.7
1998	244.7	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	756.5	27.3	546.3	1100.2	64.8	848.9	278.6	306.0	153.4	31.2	8,131.6
1999	250.4	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	781.7	27.3	546.3	1100.2	64.8	896.9	278.6	306.0	161.4	31.2	8,219.4
2000	256.0	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	806.9	27.3	546.3	1100.2	64.8	944.9	278.6	306.0	169.5	31.2	8,307.3
2001	261.7	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	832.2	27.3	546.3	1100.2	64.8	992.8	278.6	306.0	177.5	31.2	8,395.2
2002	267.3	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	857.4	27.3	546.3	1100.2	64.8	1040.8	278.6	306.0	185.6	31.2	8,483.1
2003	273.0	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	882.6	27.3	546.3	1100.2	64.8	1088.8	278.6	306.0	193.6	31.2	8,571.0
2004	278.6	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	907.8	27.3	546.3	1100.2	64.8	1136.8	278.6	306.0	201.6	31.2	8,658.8
2005	284.3	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	933.0	27.3	546.3	1100.2	64.8	1184.8	278.6	306.0	209.7	31.2	8,746.7
2006	289.9	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	958.2	27.3	546.3	1100.2	64.8	1232.8	278.6	306.0	217.7	31.2	8,834.6
2007	295.6	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	983.5	27.3	546.3	1100.2	64.8	1280.7	278.6	306.0	225.7	31.2	8,922.5
2008	301.2	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	1008.7	27.3	546.3	1100.2	64.8	1328.7	278.6	306.0	233.8	31.2	9,010.4
2009	306.9	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	1033.9	27.3	546.3	1100.2	64.8	1376.7	278.6	306.0	241.8	31.2	9,098.3
2010	312.5	8.5	44.2	29.7	17.1	65.4	112.7	1498.0	1059.1	27.3	546.3	1100.2	64.8	1424.7	278.6	306.0	249.8	31.2	9,186.1

Source: Bureau of Economic and Business Research sectors, where there were no Large Power Users in the period 1981-1986. For these two sectors the price of electricity indices were based on the average price paid by non-LPU industrial customers. The indices were used to project forward the 1981 industry-specific average price benchmark prices calculated from data contained in the 1982 Census of Manufactures.

For the prices of natural gas, oil and coal, the only Utah specific data available were found in the 1982 Census of Manufactures (containing fuels and electricity data by state for the year 1981.) In the case of natural gas, SIC specific data were available only for limited number of sectors: food; petroleum; stone, clay and glass; primary metals; fabricated metals; machinery; and electronics. In the rest of the sectors, the Utah specific natural gas price was calculated and used (by subtracting all of the SIC specific data from the Utah totals and then computing the average price for the remaining sectors). Having computed a price for natural gas for all sectors for the year 1981, the price for the years 1982-1988 was calculated by multiplying the benchmark price by an industrial customer price index for those years, calculated from data supplied by Mountain Fuel Supply Company.

For coal and oil, the 1982 Census of Manufactures fuels data were used to compute a Utah-specific 1981 price (no SIC specific data were used). This 1981 price was multiplied by an index calculated using U.S. industry-specific average price data provided by SRC.

The price of labor was calculated for each SIC sector by using data published in the Annual Surveys of Manufactures and the 1982 Census of Manufactures. These data were not disclosed for some SIC sectors for the years 1982-84, but were supplied for every sector in years 1984-86. As recommended by SRC, the price of labor was calculated by assuming that the average number of hours worked by production workers held for all employees in the sector, and the total payroll of the sector was divided by the estimated total employee work-hours to arrive at an estimated average price of labor for each 2-digit SIC sector.

For lack of better data for the price of materials and price of capital indices, the U.S. average values used by SRC to estimate the model parameters were employed for purposes of implementing the Utah models. The quantity of real output was computed by using the value of shipments in each of the sectors provided in the Annual Surveys of Manufactures and the 1982 Census of Manufactures. These data, like the fuels data, was not completely disclosed for each sector for the years 1981-83, but were published for every sector for the years 1984-86. The time trend indices were kept at the constant values used by SRC in estimating the model parameters. Finally, to obtain real values, all of the exogenous variable price and output variables were deflated using the Producer Price Index for Total Manufactures as recommended by SRC.

For forecast purposes all exogenous variables except two were assumed to hold constant out to the year 2010. For the years 1987 and 1988 output was assumed to increase proportionally with LPU electricity consumption. Output for most sectors was held constant from 1988 through the year 2010, except for the following sectors: food and kindred products; petroleum and coal products; machinery; and instruments. These historical growth sectors were assumed to grow from 1988 to 1989 by the following percentages: food and kindred products, 3 percent; petroleum and coal products, 5 percent; machinery 13 percent; and instruments, 11 percent. These percentages were based on the average rate of growth of real Gross State Product in these sectors over the period 1981 through 1986. The values of these increments were then assumed to hold for each succeeding year for the years 1990-2010, reflecting an assumption of linear growth rather than exponential growth.

After 1988, real electricity prices were projected to decrease by 2 percent per year through the year 1993, and then were projected to hold constant to the end of the forecast period. These projections were based on a scenario suggested by Utah Power & Light to reflect the economies expected to result from the merger with Pacific Power & Light.

Model Calibration

For the Utah Static Translog Model the multiplicative calibration approach was selected for most sectors, including food and kindred products; apparel; lumber and wood products; furniture and fixtures; paper products; printing and publishing; petroleum and coal products; rubber and plastics; primary metals; fabricated metal products; machinery; and instruments. Electricity consumption in these sectors in 1986 was projected from the 1981 value shown in the 1982 Census of Manufactures on the basis of the relative change in real Gross State Product between 1981 and 1986.

The multiplicative calibration approach was also employed in chemicals; stone, clay and glass products; and electronic equipment. However, since Large Power User consumption in these sectors in 1986 exceeded the value projected on the basis of the relative change in real Gross State Product, total consumption in the sector in 1986 was estimated by expanding LPU consumption in the sector by the ratio of total statewide employment in the sector to employment in the UP&L Utah service area. Implicit in this procedure is the assumption that non-LPU consumption in these three sectors in the UP&L Utah service area was negligible. Finally, in textiles;

transportation equipment; and miscellaneous manufacturing the intercept adjustment approach was employed. The fuel share adjustment parameters used for this purpose were derived by scaling down the U.S. parameters estimated by SRC, using value of shipments as the scaling factor.

The multiplicative calibration approach was used exclusively for calibrating the Utah Constant Elasticity of Substitution Model, using the base year electricity consumption values derived for the Utah Static Translog Model. This of course implies that base year (1986) forecasts for the two models will be identical. In addition, it implies that any differences in the forecasts generated by the two models for subsequent years must be due exclusively to differences in sensitivities to electricity price changes, since the values of the other exogenous variables (other that real output) were held constant throughout the forecast period.

Concluding Observations

It should be emphasized that the forecasts presented in Tables 1 and 2 are not intended to be definitive forecasts of Utah's future industrial electrical energy requirements, but rather illustrative of the forecasting capabilities of the INDEPTH econometric models. Certainly the forecasts are no better than the price and output assumptions that went into producing the forecasts. However, these assumptions do possess ample plausibility.

An examination of the forecasts in Table 1 suggests considerable variation in electricity price sensitivity among the different manufacturing sectors. Indeed, the Static Translog Model price elasticity of demand for electricity in printing and publishing is more than twice as great as in electronic equipment (-1.09 compared to -0.46 at prices prevailing at the end of the forecast period). A comparison of the forecasts in Table 1 with those in Table 2 also reveals some differences in electricity price sensitivity estimates between the Static Translog Model and the Constant Elasticity of Substitution Model, though for most sectors the forecasts are relatively close.

Prior to the so-called energy crisis most electrical utilities relied on some sort of naive forecasting approach that took little or no account of the market realities faced by industrial consumers of electrical energy. It is not surprising that so many utilities vastly underestimated the effect of substantial electricity price increases in the 1970s and early 1980s. The INDEPTH models provide an explicit structural framework for avoiding the sort of errors that arise due to a failure to recognize that industrial customers are, in fact, responsive to changing prices of electricity and other fuels, as well as to changing product demand.

Table 2
Utah Constant Elasticity of Substitution Model
Electrical Energy Requirements Forecasts by Manufacturing Sector
[Millions of Kwh]

Year	Food Prod.	Textiles	Clothing	Lumber Prod.	Paper Prod.	Petrol. Prod.	Rubber Prod.	Stone Prod.	Prim. Metals	Electronics	Transp. Equip.	Instruments	Misc. Mfg.
1986	135.3	2.6	38.3	25.9	58.4	425.9	21.9	546.4	687.8	216.4	242.7	58.3	19.0
1987	155.2	2.7	41.3	24.9	52.7	437.0	23.6	522.5	743.1	231.1	249.7	58.3	20.2
1988	185.6	7.0	40.6	28.6	63.0	469.9	24.5	519.0	1006.3	254.0	261.9	63.5	23.7
1989	194.6	7.0	41.3	29.0	63.6	492.8	24.7	524.8	1021.2	261.8	262.0	70.5	23.7
1990	204.7	7.1	41.9	29.4	64.2	517.1	24.8	531.1	1031.7	268.9	262.8	77.7	23.8
1991	215.4	7.1	42.6	29.9	64.8	542.1	24.9	537.4	1040.6	275.0	263.7	85.1	23.9
1992	226.6	7.2	43.4	30.3	65.4	567.5	25.0	543.9	1048.7	280.1	264.9	92.6	24.0
1993	238.1	7.2	44.1	30.8	66.0	593.4	25.1	550.5	1056.6	284.6	266.1	100.3	24.1
1994	247.1	7.2	44.1	30.8	65.9	611.6	25.0	550.3	1055.6	286.7	265.2	106.8	24.1
1995	256.6	7.2	44.1	30.8	65.8	629.9	25.0	550.3	1055.2	288.6	264.8	113.4	24.0
1996	266.3	7.2	44.1	30.8	65.8	648.1	25.0	550.3	1055.0	290.0	264.5	120.0	24.0
1997	276.1	7.2	44.0	30.8	65.8	666.2	24.9	550.3	1055.0	291.1	264.4	126.6	24.0
1998	286.1	7.2	44.0	30.8	65.8	684.2	24.9	550.3	1055.0	292.0	264.3	133.2	24.0
1999	296.3	7.2	44.0	30.8	65.8	702.1	24.9	550.3	1054.9	292.7	264.2	139.8	24.0
2000	306.5	7.2	44.0	30.8	65.8	719.8	24.9	550.3	1054.9	293.3	264.1	146.3	24.0
2001	316.9	7.2	44.0	30.8	65.8	737.4	24.9	550.3	1054.9	293.7	264.1	152.8	24.0
2002	327.4	7.2	44.0	30.8	65.8	754.9	24.9	550.3	1054.9	294.0	264.0	159.3	24.0
2003	338.0	7.2	44.0	30.8	65.8	772.3	24.9	550.3	1054.9	294.3	264.0	165.8	24.0
2004	348.7	7.2	44.0	30.8	65.8	789.6	24.9	550.3	1054.9	294.5	264.0	172.3	24.0
2005	359.5	7.2	44.0	30.8	65.8	806.8	24.9	550.3	1054.9	294.6	264.0	178.8	24.0
2006	370.5	7.2	44.0	30.8	65.8	823.9	24.9	550.3	1054.9	294.7	263.9	185.2	24.0
2007	381.6	7.2	44.0	30.8	65.8	840.9	24.9	550.3	1054.9	294.8	263.9	191.7	24.0
2008	392.7	7.2	44.0	30.8	65.8	857.8	24.9	550.3	1054.9	294.9	263.9	198.1	24.0
2009	404.0	7.2	44.0	30.8	65.8	874.6	24.9	550.3	1054.9	294.9	263.9	204.5	24.0
2010	415.4	7.2	44.0	30.8	65.8	891.4	24.9	550.3	1054.9	295.0	263.9	210.9	24.0

Source: Bureau of Economic and Business Research

Utah Business Statistics

UTAH DATA	Oct 1987	Oct 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,603	NA	NA	NA	18,809.3	NA
New Corporations (no.)	474	323	-31.9%	452.3	459.3	-1.5%
New Car, Truck and Motor Home Sales (no.)	4,755	2,301	-51.6%	4,837.9	5,061.8	-19.1%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	63.80	70.60	10.7%	67.2	62.6	7.4%
Lambs (cwt)	69.50	61.80	-11.1%	64.8	72.4	-10.5%
Milk Wholesale (cwt)	12.10	12.40	2.5%	11.6	12.0	-3.9%
Alfalfa Hay, Baled (per ton)	69.00	79.00	14.5%	74.4	66.3	12.2%
Cattle Slaughtered (live weight) (thous. of lbs.)	43,449	47,341	9.0%	46,220.3	41,051.7	12.6%
Construction						
Total Construction (thous. of dol.) (c)	135,651	106,121	-21.7%	118,299.8	120,335.7	-1.7%
Residential	45,796	42,779	-6.6%	46,961.7	51,846.7	-9.4%
Nonresidential	69,596	39,694	-43.0%	40,361.5	39,730.1	1.6%
Public Works and Utilities	20,059	23,648	17.9%	31,012.5	28,758.2	7.8%
Total Permit Construction (thous. of dol.) (d)	93,013.6	74,169.4	-20.3%	73,093.5	93,391.4	-21.7%
Residential	37,293.5	40,312.8	8.1%	34,494.7	43,607.5	-20.9%
Nonresidential	41,856.2	18,920.4	-54.8%	25,175.0	36,020.6	-30.1%
Additions, Alterations and Repairs	13,863.9	14,936.2	7.7%	13,424.7	13,763.3	-2.5%
New Dwelling Units (no.)	495	516	4.2%	476.8	670.0	-28.8%
Employment						
Civilian Labor Force (thous.)	756.8	765.6	1.2%	755.4	756.3	-0.1%
Total Employed Persons	716.8	732.7	2.2%	716.1	708.2	1.1%
Unemployed Persons	40.0	32.9	-17.8%	39.3	48.1	-18.4%
Percent Total Labor Force	5.3	4.3	-18.9%	5.2	6.4	-18.4%
Employees on Nonagricultural Payrolls (thous. of jobs)	648.0	670.6	3.5%	651.7	638.6	2.0%
Manufacturing	95.2	99.2	4.2%	96.3	91.6	5.1%
Mining	8.3	8.1	-2.4%	8.3	7.9	5.2%
Contract Construction	27.1	26.8	-1.1%	24.4	27.5	-11.4%
Transportation, Communication and Utilities	38.5	40.4	4.9%	38.9	37.7	3.1%
Wholesale Trade	34.6	34.9	0.9%	34.7	35.1	-1.3%
Retail Trade	117.6	121.6	3.4%	118.8	117.9	0.8%
Finance, Insurance and Real Estate	33.4	32.9	-1.5%	33.6	33.7	-0.2%
Services (a)	151.5	162.5	7.3%	155.0	145.3	6.7%
Federal Government	39.0	39.4	1.0%	39.5	40.0	-1.3%
State Government(b)	38.2	38.6	1.0%	37.8	37.9	-0.3%
Local Government(b)	64.8	66.2	2.2%	64.6	63.8	1.2%
Average Weekly Hours						
Manufacturing	39.7	41.0	3.3%	40.6	39.4	3.1%
Mining	42.1	40.6	-3.6%	42.8	41.4	3.4%
Wholesale Trade	38.9	37.3	-4.1%	37.8	37.8	0.2%
Retail Trade	27.9	28.4	1.8%	28.1	28.1	0.1%
Amount of Unemployment Compensation (thous. of dol.)	4,809.0	3,609.9	-24.9%	5,955.3	8,452.4	-29.5%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,474.8	2,401.9	-2.9%	2,353.6	2,447.3	-3.8%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	85,901.9	118,489.8	37.9%	147,601.2	135,624.4	8.8%
Sales and Use Tax	19,065.1	32,256.0	69.2%	53,210.3	47,469.6	12.1%
Motor Fuel Tax	12,471.1	13,551.6	8.7%	10,934.6	8,801.3	24.2%
Individual Income Tax	26,109.5	49,416.8	89.3%	53,811.8	47,120.1	14.2%
Corporation Franchise Tax	9,687.8	9,678.0	-0.1%	5,965.1	6,247.4	-4.5%
Production						
Net Electric Power Utilized (mil. of kwh)	1,160.1	1,199.8	3.4%	1,237.1	1,146.7	7.9%
Crude Oil to Refineries (thous. of bbls.)	3,735.5	NA	NA	NA	3,823.1	NA
Crude Oil (thous. of bbls.)	3,047.2	2,724.2	-10.6%	2,808.2	2,999.9	-6.4%
Natural Gas (mil. of cu. ft.)	25,011.8	22,417.8	-10.4%	23,094.0	21,315.0	8.3%
Coal (thous. short tons)	1,713.0	1,423.0	-16.9%	1,510.9	1,130.6	33.6%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	767,093	796,415	3.8%	861,473.0	842,657.3	2.2%
Highway Traffic Count Across State Lines	37,185	40,603	9.2%	NA	38,070.8	NA
Transient Room Taxes (thous. of dol.)	248.3	275.6	11.0%	563.8	457.7	23.2%
Visits, State, Nat'l. Parks, Monuments (thous.)	890.7	1,004.7	12.8%	1,101.6	1,057.5	4.2%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	483,603	492,321	1.8%	487,111.6	478,752.2	1.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	177,961	183,361	3.0%	180,117.0	174,759.8	3.1%
Electric Customers (Residential)	473,304	477,303	0.8%	475,919.3	471,795.8	0.9%
Electric Customers (Commercial)	45,937	46,939	2.2%	46,691.0	46,128.8	1.2%
Natural Gas Customers (Residential & Commercial)	443,530	457,494	3.1%	457,314.3	445,067.8	2.8%
Natural Gas Customers (Industrial)	553	556	0.5%	547.9	556.5	-1.5%

Utah Business Statistics

UTAH DATA	Oct 1987	Oct 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.4r	53.5fo	2.1%	52.4	52.3	0.2%
Unemployment Rate	4.7r	4.1	-12.8%	4.6	5.4	-14.7%
Auth. Permit Construction (thous. of dol.)	7,805.6	7,200.4	-7.8%	9,409.2	12,786.8	-26.4%
New Dwelling Units (no.)	79	74	-6.3%	68.8	97.1	-29.2%
Postal Receipts (thous. of dol.)	335.2	450.8	34.5%	406.6	NA	NA
Electric Customers (Residential)	47,691	48,256	1.2%	48,038.8	47,040.5	2.1%
Electric Customers (Commercial)	3,304	3,446	4.3%	3,425.3	3,265.8	4.9%
Natural Gas Customers (Residential)	48,645	50,407	3.6%	50,146.6	48,536.5	3.3%
Natural Gas Customers (Industrial)	52	53	1.9%	52.4	51.8	1.3%
Telephone Lines in Service (Mt. Bell)(Residential)	54,468	55,770	2.4%	55,124.1	54,707.7	0.8%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,681	11,577	8.4%	11,193.5	10,466.5	6.9%
Salt Lake County						
Non-Ag. Employment (thous.)	335.3r	345.4fo	3.0%	338.1	332.7	1.6%
Unemployment Rate	4.8r	4.1	-14.6%	4.8	5.5	-12.6%
Auth. Permit Construction (thous. of dol.)	45,160.8	32,746.5	-27.5%	32,757.1	44,471.1	-26.3%
New Dwelling Units (no.)	185	194	4.9%	180.1	267.5	-32.7%
Postal Receipts (thous. of dol.)	6,956.5	8,548.7	22.9%	7,931.3	7,179.8	10.5%
Electric Customers (Residential)	237,181	240,062	1.2%	237,151.8	235,770.3	1.4%
Electric Customers (Commercial)	20,027	20,438	2.1%	20,353.1	19,834.4	2.6%
Natural Gas Customers (Residential)	214,561	219,138	2.1%	220,212.4	216,835.3	1.6%
Natural Gas Customers (Industrial)	235	241	2.6%	235.9	242.8	-2.8%
Telephone Lines in Service (Mt. Bell)(Residential)	228,297	231,655	1.5%	229,706.8	226,219.8	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,594	111,826	1.1%	110,769.2	109,678.8	1.0%
Utah County						
Non-Ag. Employment (thous.)	78.0r	80.9fo	3.7%	75.9	73.5	3.3%
Unemployment Rate	5.1r	3.9	-23.5%	4.7	7.2	-34.6%
Auth. Permit Construction (thous. of dol.)	14,046.7	8,401.2	-40.2%	10,109.1	12,573.1	-19.6%
New Dwelling Units (no.)	78	41	-47.4%	63.8	93.3	-31.6%
Postal Receipts (thous. of dol.)	948.0	1,242.1	31.0%	1,130.3	931.8	21.3%
Electric Customers (Residential)	51,470	52,231	1.5%	52,146.8	51,829.3	0.6%
Electric Customers (Commercial)	5,856	6,057	3.4%	5,959.4	6,338.3	-6.0%
Natural Gas Customers (Residential)	59,952	61,650	2.8%	61,553.8	60,191.9	2.3%
Natural Gas Customers (Industrial)	69	69	0.0%	67.8	68.3	-0.7%
Telephone Lines in Service (Mt. Bell)(Residential)	64,122	65,750	2.5%	64,409.3	62,337.8	3.3%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,347	20,888	8.0%	19,916.4	18,238.8	9.2%
Weber County						
Non-Ag. Employment (thous.)	60.1r	62.0fo	3.2%	61.1	60.3	1.4%
Unemployment Rate	6.2r	4.9	-21.0%	5.9	7.0	-16.8%
Auth. Permit Construction (thous. of dol.)	9,923.4	4,426.1	-55.4%	5,577.7	8,460.1	-34.1%
New Dwelling Units (no.)	55	49	-10.9%	47.3	69.3	-31.7%
Postal Receipts (thous. of dol.)	563.1	660.2	17.2%	659.7	615.5	7.2%
Electric Customers (Residential)	52,885	53,480	1.1%	53,437.4	52,702.4	1.4%
Electric Customers (Commercial)	4,906	4,915	0.2%	4,923.9	4,830.0	1.9%
Natural Gas Customers (Residential)	48,590	49,379	1.6%	49,689.8	48,906.5	1.6%
Natural Gas Customers (Industrial)	86	84	-2.3%	83.2	85.0	-2.2%
Telephone Lines in Service (Mt. Bell)(Residential)	46,098	46,764	1.4%	46,366.7	45,862.4	1.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,300	12,116	7.2%	11,741.8	10,901.8	7.7%

NA Not Available   r Revised   fo Forecast

Sources:

Personal Income:	Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations:	Utah Secretary of State.
New Car and Truck Sales:	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture:	U.S. Department of Agriculture, Agriculture, Utah: Utah Crop and Livestock Reporting Service.
Construction Data:	F.W. Dodge Statistics and Utah Construction Report, Bureau of Economic and Business Research.
Employment Data:	Utah Department of Employment Security.
Savings Information:	Utah Savings and Loan Institutions.
Tax Collections:	Utah State TAx Commission.
Net Electric Power Utilized:	Cooperating Utah power companies.
Crude Oil Production:	Area oil refineries.
Natural Gas Production:	Utah Department of Oil, Gas, and Mining.
Coal Production:	U.S. Department of Energy.
Air Passengers:	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count:	Utah Department of Transportation.
Visits to State and National Parks and Monuments:	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data:	Cooperating Utah utility companies.
Postal Receipts:	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Footnotes:

1 Obtained from F.W. Dodge Statistics.
2 Obtained from Utah Construction Report.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

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NATIONAL DATA	Oct 1987	Oct 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,662.8	4,995.2	7.1%	4,807.7	4,467.0	7.6%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,897.2	4,178.3	7.2%	4,017.1	3,729.7	7.7%
Industrial Production Indexes (seasonally adjusted) (1977=100)	132.5	139.4	5.2%	136.1	128.6	5.8%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	406.8	445.7	9.6%	425.4	384.5	10.6%
Index of Leading Indicators (1982=100)	141.8	143.9	1.5%	150.2	184.3	-18.5%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	115.3	120.2	4.2%	117.4	112.8	4.1%
CPI-U (All Urban Consumers) Food & Beverages	114.3	120.3	5.2%	117.2	112.9	3.8%
CPI-U (All Urban Consumers) Housing	115.5	119.0	3.0%	117.7	113.5	3.6%
CPI-U (All Urban Consumers) Transportation	107.1	110.0	2.7%	108.2	104.3	3.7%
CPI-U (All Urban Consumers) Medical Care	132.3	141.2	6.7%	137.2	129.0	6.4%
CPI-U (All Urban Consumers) Energy	89.8	89.9	0.1%	89.2	87.4	2.1%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	106.2	109.3	2.9%	107.3	104.9	2.3%
GNP Price Deflator (1982=100) (qtly.)	118.9	124.0	4.3%	120.9	117.0	3.3%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	120.4	122.1	1.4%	121.3	119.5	1.6%
Total Civilian Employment (mil.)	113.2	115.6	2.1%	114.6	111.9	2.4%
Unemployment Rate	6.0	5.3	-11.7%	5.6	6.4	-12.2%
Construction						
Total Construction (mil. of dol.)	23,360.2	20,313.1	-13.0%	20,253.8	21,110.7	-4.1%
Residential	10,289.7	9,996.0	-2.9%	9,647.7	9,975.0	-3.3%
Nonresidential	9,402.9	6,939.4	-26.2%	6,965.7	7,347.3	-5.2%
Non-Building	3,667.6	3,377.7	-7.9%	3,638.7	3,811.0	-4.5%
New Dwelling Units (no.)	130,314	117,891	-9.5%	117,649.7	134,058.5	-12.2%
Interest Rates						
Short Term (3-month Treasury bill rate)	6.40	7.34	14.7%	6.3	5.8	9.8%
Long Term (30-year Treasury bond yields)	9.61	8.89	-7.5%	9.0	8.4	6.6%
Prime Rates Charged by Banks on Short-term Business Loans (ave.)	9.07	10.00	10.3%	9.1	8.0	13.4%
Mortgage Rates (new homes)	8.86	8.77	-1.0%	8.8	9.0	-2.7%

Sources: Business Conditions Digest, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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NOVELL, INC.

Jan Elise Crispin-Little

Overview

Under the guidance of Raymond Noorda, Novell, Inc. in Provo, Utah has become an industry leader in the local area network (LAN) market.[1] Evolving from the fragments of Novell Data Systems, Inc., Novell designs, manufactures, markets, and services high performance LAN software, systems, and other connectivity products that enable personal computers to share resources (including communications devices, printers, and hard disk storage). Novell's LAN systems use NetWare, a proprietary software operating system.

In 1988, revenues increased from $182.8 million to $281.1 million, a growth of 54 percent. Software product sales comprise 60 percent of Novell's revenues. Overall, software sales account for an increasingly large portion of total revenues. The company's leading software product is NetWare, an operating system software program considered to be the de facto standard in the LAN market. In 1988, sales of all software products topped $168.6 million.

Employment gains match those of sales. Currently 1,600 people work for Novell. Approximately 1,000 people are employed in one of the company's two Utah facilities. Novell's non-Utah employment has increased significantly over the past two years with the acquisition of three non-Utah computer hardware and software companies.

Novell's Common Stock has been traded in the over-the-counter market, under the NASDAQ symbol "NOVL" since January 1985. As of December 1987, the company had slightly more than 27.7 million shares outstanding. Regarded as the pioneer of LANs, Novell leads the competition in terms of its worldwide installed user base (the number of people using a NetWare operating system).

By the end of 1988, more than 300,000 NetWare systems had been installed worldwide, representing approximately 3.0 million NetWare users. With more than 60 percent of the Fortune 5000 market and approximately 50 percent of the remaining PC LAN market, Novell controls the single largest portion of the PC LAN industry in the United States. Internationally, their market share is about 43 percent.

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[1] A typical LAN system is an integrated family of hardware and software products consisting of five primary elements: (1) network servers (computers that manage the sharing of network resources); (2) network interface cards (components that physically connect PCs to the LAN); (3) the shared resources (items such as application software, hard disk subsystems, and printers); (4) network operating system software; and (5) the PCs that are used as workstations.

Novell's products are distributed through a diversified network of dealers, distributors, original equipment manufacturers (OEMs), value-added resellers (VARs), computer retail chains, and major end users. LAN technology is also provided to 35 OEM's that sell NetWare under their own brand name.

During 1988, sales made to distributors represented 48 percent of total sales. The U.S., Canada, Australia, and Europe are the major markets for the company's products. In 1988, export sales to foreign customers reached $90.9 million or roughly 32 percent of Novell's total revenues. Transactions with European countries accounted for a significant portion of this total (71 percent in 1988). Novell maintains foreign offices in West Germany, England, Hong Kong, Canada, Africa, and the Middle East.

Novell competes with companies that supply products for the PC LAN market including both software and hardware manufacturers. Two of Novell's most formidable competitors are International Business Machine Corporation (IBM) and 3Com Corporation.

Early History

Novell, Inc. was formed in 1983 from the pieces of Novell Data Systems, Inc. (NDSI), an Orem-based company that designed and manufactured computer workstations. NDSI was founded in 1979 by Jack Davis, Frank Richins, and George Canova.

Davis and Richins were business partners in Terminal Specialties, Inc., a small computer hardware distribution business. They wanted to move into what they perceived as the more lucrative manufacturing side of the computer market. To do this, a strong financial partner was needed so Davis contacted a former boss, and good friend, George Canova.

Davis convinced Canova that there was money to be made in hardware manufacturing, and after several meetings, Canova agreed to invest. Using the proceeds from the sale of his two companies, Canova became a co-founder and president of NDSI. Davis assumed control of sales and marketing activities. (Richins also invested in the venture but never assumed a management role.)

Although the founders invested heavily in NDSI, additional funds were soon needed. The capital came from a company called Safeguard Scientifics, Inc. (SSI), a quasi-investment firm based in Pennsylvania that invested in high-growth companies. Adolf Paier, the President and Chief Executive Officer of SSI, was another associate of Davis's and agreed to discuss the possibility of a venture investment.

It is not uncommon for fledgling firms to seek venture capital; however, NDSI's situation was unique. It had no working prototype, a condition that typically discourages venture firm participation. However, Davis was able to convince SSI's board that the idea was sound, and in 1980, in exchange for $2.5 million, SSI acquired a controlling interest in NDSI.

NDSI's Product

The original concept was a workstation system based on the Motorola 68000 microprocessor, that included several stand-alone "intelligent" terminals (the Novell UT100), a printer (the Novell Image 800 dot matrix printer), and a data management computer (the Novell N40). Together, these products formed the LAN. This LAN was a proprietary system that would allow NDSI computers to share resources by accessing the applications software from the dedicated file server. The development strategy was simple. The company hired a team of experts and assigned each one the task of designing a specific component of the system.

Rusty Woodbury, an engineer and acquaintance of Jack Davis, was hired to develop the terminal. Woodbury had previously designed terminals for Beehive Electronics. Phil Long was hired to write the software code that would allow the workstation and the printer to "talk" to each other. The specifications for the printer were purchased from TryTel, a California-based hardware manufacturer.

As development work progressed, the system designers realized that a distributive processing orientation would be more logical and easier to perform, so development efforts moved toward the construction of a network that used a sophisticated software product to tie the individual components together (this software eventually became the backbone of the company's product line). Now, rather than constructing a stand alone workstation, the company focused its efforts on designing a network system using the workstation as a central processor with cabling connecting it to several terminals and printers. Software was the element that tied the system together.

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[2] SSI is not a venture investor in the traditional sense although it functions like one in many ways. The company spots fast-growing, small companies and invests in them, usually assuming a controlling interest. Limited management and administrative services are provided for a prearranged fee. When SSI feels the time is right, it allows shareholders of its own stock to purchase the newly acquired shares in a rights offering.

The networking concept was sound, but the developers underestimated the time and resources needed to design such a sophisticated system. After the decision was made to design a networking system, two separate development projects were initiated. First, design work began on the 68000-based file server that was to act as the network processor for the system. Second, the terminal workstation had to be refined.

Complications surfaced when the development team realized the existing software was not adequate to drive the system. A software consulting group, SuperSet, was hired to write a temporary program so NDSI could prove to its investors that the networking concept was feasible. Long planned to use SuperSet's program only until the investors were satisfied, then write a program of his own.

Deadline commitments made to investors were not being met, and SSI was pressuring NDSI's management to market a product. In an attempt to comply with investor's demands, NDSI began selling its untested network system at the end of 1980. Complaints began rolling in almost immediately. As Jim Bills, Executive Vice President of Novell's Systems and Services Group (NSSG), explains:

> *They did finish the product and it worked. The problem was the system was too expensive for what it did. You had a full-blown 68000 processor and at that time the technology was not cheap. You also got [sic] a terminal that was more than a terminal. It had a processor board, a memory board, a serial I-O board; it had four different boards. The terminal alone cost more than $13,000. It was the highest priced system in that class. It could be marketed, but it was a hard sell. If it would have been fast and would have had applications software that was sound, it would have been okay. The technology was right. The price was just too high.*

Integrating reliable applications software was another impediment to developing a viable system. With the exception of WordStar, a word processing program, software packages were not sophisticated enough to interact with the network. Often they would not run properly, and NDSI's engineers were forced to debug the system after it had been shipped. Unfortunately, no resources had been allocated for support functions, and most of the products were returned.

External Complications

IBM's decision to introduce a personal computer (PC) that utilized the MS-DOS architecture developed by MicroSoft Corporation further complicated the situation. NDSI's first system, as with all early LAN systems, allowed users to connect only those information processing devices that incorporated interfaces and software protocols on proprietary-based networks. Therefore, when a customer purchased a LAN product, he was tying himself to both the vendor and the vendor's products. By establishing a system that used the MS-DOS architecture, programmers could write applications software for one system, rather than for several different proprietary systems.

Although IBM's announcement legitimized the concept of PCs, it made NDSI's terminal obsolete. Ironically, the SuperSet group (still working for the company on a full-time consulting basis) had anticipated this move by IBM. Without NDSI's knowledge the group had designed an interface that allowed the IBM PC to connect with the 68000 processor. This product supported different operating systems that shared the same file server. (This product eventually became the focus of Novell's product line, but at the time it was developed, NDSI was in chaos, and SuperSet's product was ignored.)

Internal Difficulties

On top of the external challenges, the company was experiencing internal difficulties as well, namely, money and management. Workstation development had consumed the bulk of the company's resources. NDSI's management had been able to offset some of the administrative and operating costs by selling its printer as a stand-alone item. Unfortunately, this was a short-lived strategy. NDSI did not have an exclusive license to manufacture and market the printer. The design specifications had been sold by TryTel to NDSI, InfoScribe, and Fontel, Inc. While NDSI manufactured the printer based on the original specifications, Fontel and InfoScribe modified those specifications and ultimately designed a superior printer. By 1981, NDSI's printer was obsolete, and SSI's board was reluctant to commit further financial commitments.

Aside from the complexity of the development itself, the company was plagued by a series of poor management decisions. Every department head felt that he should dictate company strategy, and as one company executive indicated, "There were too many people at the top and not enough workers." Moreover, Davis overestimated the abilities of his people, and the time necessary to complete such a sophisticated product.

SSI Cleans House

With the marketing failure of NDSI's network system, SSI's board members realized they had misjudged the ability of NDSI's management team and decided to make changes. The board pressured Canova to fire Davis. In January 1981 Davis left the firm and a new sales director was named. Within weeks the position of sales director was again vacant when the newly-named director died suddenly of a heart attack. In February, Canova and Long were both asked to leave the company, and by the spring of 1981, most of the top positions at NDSI were unoccupied.

Jack Messman, Executive Vice President of SSI, stepped in as NDSI's acting president. SuperSet assumed responsibility for software development, and the search began for a new management team.

David Guerro, an ambitious salesman running NDSI's California sales office, convinced Messman that he could turn the company around. Partly as a result of Messman's desire to relinquish the position, Guerro's credentials were never fully examined before he was named as NDSI's new president. It was not long before SSI realized that Guerro was not the right person for the job and the company floundered under his management.

Early in 1982, Guerro resigned and Messman again assumed the role of president, and employment was reduced to 30 people. SSI started selling off NDSI's equipment and began looking for a buyer.

Throughout Messman's tenure as president, staff reductions continued as SSI tried to sell the company. Several offers were made, but nothing legitimate materialized. Jack Davis finally provided SSI with an answer. Davis had left the company owning stock and with a vested interest in its success, he contacted Messman and recommended that he talk to Raymond Noorda.

Davis and Noorda knew each other from their years together at General Automation, Inc. Noorda, a native Utahn working for Boschert, Inc. in California, had established himself as a turnaround artist for failing firms. Through the grapevine, Davis learned that Noorda would consider moving back to Utah if the right opportunity were presented.

On the heels of a failed acquisition, SSI contacted Noorda in the fall of 1982 and offered him the NDSI presidency. Not only did Noorda accept, he purchased 28 percent of the company. Through strategic maneuvering, Novell, Inc. was formed and purchased all the intellectual property, assets, and liabilities of NDSI for 350,000 shares of Novell's preferred stock.[3] For $125,000 Noorda became part-owner of a company in financial turmoil, with a work force whose morale was at an all-time low, and a product that only a handful of people understood.

Novell, Inc.

The existing company, Novell, Inc. is very different from the one that preceded it. After continuous struggles, Novell has emerged as a major player in the networking industry. The components that had an influential role in achieving that position are discussed here.

The New President

Perhaps the single most significant factor in Novell's success has been Raymond Noorda. He brought to Novell a vision for the future, and more importantly, a plan to achieve that vision. One of his first challenges was to find a way to motivate the remaining employees given the company's financial constraints.

Motivating Employees

Reeling from Safeguard's efforts to sell the firm and three lay-offs that left only a skeleton crew, employee morale was sagging. The situation is explained by Judith Clarke, Senior Vice President of Corporate Communications:

> *There were just a dozen of us that were left after the big lay-off and we were just kind of pulling things together. We didn't know if we were going to have a paycheck next week or not, and then he [Noorda] came in and interviewed everybody. His technique is to use the resources that are available and do the best you can with what you have, and to build on that. You know, cull out anything that is wasteful and he did just that.*

Rather than bring a new management team with him to Novell, Noorda looked internally for his core group. He met with employees and assigned responsibilities according to his perceptions of each person's abilities---many of these people were later installed as officers in the company.

Financial constraints posed yet another difficulty. Without a profitable product line, and no source of revenue on the horizon, Noorda had to find a way to provide financial incentives that would not strain the company's budget. He did this by establishing a stock option plan that allowed employees to purchase Common Stock for an average price of $.05 per share.

Focusing Development Efforts

In prior years, the company headed off in too many directions; there was no nucleus around which it could grow. Raymond Noorda provided this important leadership core. One of his first decisions was to focus Novell's product development efforts around NetWare (the company's stellar networking software).

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[3] At this point, SSI completely owned NDSI (which was technically a shell) and all of NDSI's property (including the 350,000 shares of Novell's Preferred Stock). Simultaneously, NDSI was merged into SSI, giving SSI a 50.2 percent controlling interest in Novell, Inc. These shares were converted to 4.9 million shares of Novell's Common Stock in 1984.

This strategy has been a cornerstone of Novell's success. Under previous management, the development and product line had become too unwieldy and unmanageable. As Judith Clark explains:

> *Ray has the ability to bring focus to the problem. He is a simplifier, and he causes people to focus. He came here with a plan, saw what was valuable long-term, which was the networking software, and decided that it would be our product. The company used hardware as a tactic to position that product but the software was the one we developed. When the hardware is no longer needed anymore, then we won't use it.*

Realizing the potential of the software developed by SuperSet, Noorda extended the group's consulting contract and in exchange for all the rights to the software "shell" (which became the company's NetWare operating system) SuperSet received an aggregate of 665,000 shares of Novell Common Stock.

Novell's Product

NDSI's failed system became Novell's success story. NDSI's 68000 file server became Novell's 68B file server--the major sales component of the company's proprietary S-Net LAN System. Novell then converted the 68B's software to run on the 8086 and 80286 MS-DOS-based system. This shift in strategy permitted LANs based solely on PC technology, eliminating the need for a mainframe environment.

NDSI created a market for networking products in the late 1980s. NDSI's engineers had conceptualized and designed a product that was years ahead of its time, and when the proper management was put in place, the company's products skyrocketed. Under Noorda's guidance, the company redirected its development efforts to enhancing NetWare, although the company presently designs and markets several versions of NetWare, LANs that combine NetWare with LAN hardware, LAN communication products, and database retrieval products.[4]

At present Novell is the leader in the PC networking market in terms of installed user base and technical superiority. This success has not been easily won, nor is it the result of any single development strategy. Rather, it is the culmination of many strategies that straddle both business and product development.

NetWare Operating System

While most LAN manufacturers and developers focused on the hardware and communication protocols of LANs, Novell has taken a different route, concentrating its development efforts on producing a superior networking software product called NetWare. (A complete list of Novell's products and release dates is contained in Exhibit 1.)

"LAN hardware independence" was (and continues to be) one of NetWare's most impressive features. This independence makes NetWare compatible with a variety of networking hardware systems. Because NetWare utilizes Novell's proprietary file structure rather than the more limited PC-DOS format, it provides the user with a higher level of control, data integrity, and security than conventional DOS-based PC networks.

NetWare is implemented on a LAN by loading a software "shell" onto each PC on the network, and loading network management software on PCs that function as file servers. The shell coexists with, but does not alter, the basic operating system of the PC. The shell interprets the PCs request to access network resources, such as word processing and spreadsheet applications, and translates these requests into the NetWare format.

Since 1983, Novell has reconfigured its basic NetWare product to interact with all popular networking topologies, ranging from the Motorola 68000 to the Apple Macintosh line of computers. These reconfigurations have the same fundamental mode of operation: one dedicated PC acting as the "server" for all file sharing and printing functions.

The importance of NetWare as the company's flagship product has grown over the past six years. In 1983, Novell marketed NetWare exclusively with its proprietary LAN system NetWare/S-Net. However, within a year, the company had successfully modified NetWare and introduced a new version, NetWare 86, that supported the 8086/88 family of microprocessors used in IBM's personal computers, including the Intel 80286 microprocessor used in the IBM PC AT.

This new software was compatible with 11 different LAN configurations sold by companies such as 3Com, IBM, and Western Digital. During 1985, the company introduced Advanced NetWare as a replacement for the original NetWare operating system. A

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[4] In December 1988, Novell announced that it was phasing out its nonstrategic hardware products. Although the company does have a diverse software product line, NetWare is Novell's flagship product and is the only one discussed in this article.

Exhibit 1
Novell's Major Product Offerings

Product Group	1983	1984	1985	1986	1987	1988
Software	NetWare	NetWare/86	Advanced NetWare Advanced NetWare/68 Advanced NetWare/86 NetWare/268 Advanced NetWare/268	SFT NetWare/2.0 Level I SFT NetWare/2.0 Level II SFT NetWare/286	SFT NetWare/2.1 Advanced NetWare/2.0a ELS NetWare Level I	ELS NetWare Level II Advanced NetWare NetWare for VMS NetWare v2.11 NetWare v2.15 NetWare for OS2 NetWare for Macintosh SFT NetWare/286 v2.1
Local Area Network Systems	**Servers** NetWare/68	**Servers** NetWare/86	**Servers** NetWare/286	**Servers** NetWare/286A NetWare/286B NetWare/68B	**Servers** NetWare/386A	**Servers** NetWare/386AE
		Adapters OMNINET G-Net ARCnet	**Adapters** ProNet Ethernet +	**Adapters** RXNet	**Adapters** NE1000	**Adapters** NE2000 ARCnet/68 RXNet/2
		Storage Subsystems "Generic" Subsystem		**Storage Subsystems** NDS2 NDS4	**Storage Subsystems** Disk Coprocessor Board **Workstations** PCterminal	**Storage Subsystems** Disk Coprocessor Board/2
Communications Products		SNA Gateway NetWare Bridge		Message Handling Service Asynchronous Communications Service	Asynchronous Remote Bridge PCOX X.25 Remote Bridge PCOX SNA Gateway	Asynchronous Connection Service NetWare X.25 Gateway
Database Retrieval Products				NetWare/Btrieve	NetWare/SQL NetWare/XQL	NetWare Archive Server

Source: Compiled by the Bureau of Economic and Business Research.

brief description of Novell's principal NetWare products follows.

Advanced NetWare. This product supported multiple file servers and added internetworking capabilities. Users were able to access common files, print documents on one of several internetwork printers and send messages directly between individual workstations. The internetwork feature allowed users to access files on hard disks of other internetwork file servers.

System Fault Tolerance NetWare. In 1986, Novell introduced System Fault Tolerance (SFT) NetWare---the most powerful and sophisticated networking product on the market at that time. Sold in two levels, SFT NetWare provided an important feature in a LAN system, namely protection. While Advanced NetWare provided some data protection features, SFT expanded this level of protection. SFT NetWare Level I provided for disk media defect detection without disrupting normal workstation operations.

SFT NetWare Level II could run hard disk drives or complete servers in a "shadow" or mirror mode. Disk shadowing allowed SFT to duplicate, simultaneously, an entire physical volume on a second disk to prevent data loss in the event of a subsystem failure. If one drive failed or faltered, SFT Level II automatically reconstructed the data from the shadowed unit without halting the network.

Advanced NetWare Version 2.0a. This product offered several powerful features, including DOS 2.0 and higher compatibility, allowing mulituser software applications developed for DOS to run unmodified on NetWare; internal bridging, permitting up to four supported networks to bridge through one file server; NetBIOS emulation, allowing software applications written for IBM networks to run on any NetWare supported hardware; and universal operating system software interfaces, providing off-the-shelf operating system software for any supported hardware. Advanced NetWare v2.0a supported 41 different LAN configurations.

NetWare v2.15. One of the most impressive coups for Novell in 1988 was the release of NetWare v2.15 (NetWare for Macintosh). Introduced in June 1988, this product provided a means by which PC and Macintosh users could share files and data across a network. Each workstation continues to operate in its native environment so that users of Macintosh, IBM PC, and PS/2 workstations continue to operate in the environment they know while sharing files and data transparently across the network.

NetWare for VMS. In February 1988, Novell made its first leap into the Digital Equipment Corp. (DEC) arena with the announcement of NetWare for VMS, a high performance software product that allows PC users on a NetWare network to share data, print services, and applications with DEC's VAX computers.

The OS/2 Option. Early in 1987, IBM announced the introduction of Operating System/2 (OS/2), a second generation operating system for the 80286 and 80386-based microcomputers. OS/2 is a powerful and flexible operating system that removes the memory restrictions imposed by PC-DOS, operates in a protected mode, and allows multitasking. As a joint developer of OS/2, Microsoft Corporation, in conjunction with 3Com, Inc. immediately announced the development of a networking product for OS/2 called the LAN Manager.

In response, Novell announced that it would not license the MicroSoft LAN Manager, but would develop a networking solution for OS/2 using its flagship NetWare Operating System. The new product, Nondedicated NetWare for OS/2, allows NetWare (both SFT v2.1 and Advanced Netware v2.1) to run under OS/2 on a network file server. In addition, NetWare for OS/2 will support portions of the LAN Manager.

Entry Level Solution (ELS) NetWare, Levels I and II. The ELS NetWare Level I family of products was designed specifically for small business work groups and the first-time LAN user. Using a nondedicated 80286 file server, ELS Level I permits up to four simultaneous users and is relatively inexpensive. The introduction of ELS Level I was a strategic move for Novell. It was the company's first attempt to capture the low-end market. The strategy was to develop customer loyalty at an early stage by providing an inexpensive networking system. As the customer's networking needs expand, Novell provides an easy upgrade path with either ELS Level II, Advanced Netware, or SFT NetWare.

ELS Level II was introduced to the market in 1988 and is considered to be one of Novell's main product family groups. It is targeted for small remote offices with eight or fewer simultaneous users.

Future Releases

Remaining true to its software development commitment, Novell has embarked upon a Universal Network Architecture (UNA) strategy. The goal of UNA is to allow IBM and IBM-compatible, Apple Macintosh, and UNIX-based PCs and workstations to coexist on the same network, sharing access to network files, IBM mainframe and DEC VAX host computers. Novell also plans to provide connectivity capabilities between different LANs; between LANs, mainframes and minicomputer hosts; and between remote LANs and PCs.

Acquisitions and Joint Ventures

Buying expertise is one product development strategy that has been explored by Novell's management. Since October 1986, Novell has acquired three small computer companies: Santa Clara Systems, Inc. (1986); CXI, Inc. (1987); and SoftCraft, Inc. (1987). These acquisitions helped Novell enter new markets, and expand its product lines without incurring enormous costs.

Novell has entered into joint ventures with MICON-Interlan and British Telecom, Ltd. Novell and MICOM-Interlan have teamed up to develop NetWare TCP/IP Option, a product that allows users on TCP/IP networks to transfer files to and from Advanced NetWare 286 file servers and gives NetWare LAN users access to VAX/VMS and host UNIX.
The technology developed as a result of the joint venture with British Telecom Ltd. (electronic messaging X.400) will for the first time, provide worldwide electronic messaging capabilities for NetWare PC LAN users. This joint venture is of particular interest to Novell as the company is attempting to expand its NetWare presence in Europe.[5]

Essentially, Novell's acquisitions and joint ventures have expanded the company's product lines into areas where Novell had no previous expertise. By purchasing that expertise, in all cases for less than what it would have taken Novell to develop a similar product, the company avoids "reinventing the wheel." These new products are attractive to Fortune 1000 companies that need connectivity beyond PC-based work groups.

Marketing

"NetWare everywhere" is Novell's motto. To this end, the company has embarked on an aggressive, sophisticated sales and marketing program, utilizing an elaborate distribution system, extensive education and training programs, and expanded service and support functions.

Approximately one-third of Novell's labor force is involved in sales, marketing and customer support activities. The company aggressively markets its NetWare family of LAN products through a broad distribution channel that includes distributors, dealers, OEMs and value-added resellers. The sales and marketing efforts are conducted from Novell's headquarters in Provo, Utah, and to a lesser extent from 14 domestic and four foreign offices. The most recent sales and training facility was established in Salt Lake City, Utah.

In 1988, Novell announced that it was moving away from the hardware business and would try to convince former competitors to take another look at the NetWare System for possible integration with their own systems. This allows Novell to ally itself with major PC manufacturers such as DEC and IBM, a move that could give Novell access to the lucrative micro-to-mainframe connectivity market. For example, the PC networking market is estimated to reach $2 billion in 1988 compared to the $200 billion expected to be spent integrating micros, minis, and mainframes.[6]

Marketing Strategy

Novell's marketing strategy is a two-step process. The main thrust is to "grow the market" and then educate the users in that market. These two objectives are at the core of all Novell's marketing decisions.

Much of a company's success depends on the growth of the market in which it participates. Novell is no exception. The LAN market was virtually nonexistent ten years ago when Novell's predecessor (NDSI) began developing a system for distributive processing. When Novell was formed, Raymond Noorda committed to accomplish two goals. First, he had to convince people that networking was viable and valuable; second, he had to expand the market for LAN products by providing users with the hardware to utilize networking products.

Education. Even in Novell's early years, education played a significant role in its marketing endeavors. Judith Clarke explains those efforts:

> *In the early years, he [Noorda] especially emphasized the educational aspect of marketing the company's product. He personally went to companies, explaining and demonstrating the product, giving away software, and helping other companies develop compatible products.*

Currently, Novell actively promotes programs to inform the end user about Novell's products and then provides a forum where LAN manufacturers, customers, and vendors can learn more about the LAN market in general. Some of the most notable educational efforts include the publication of *LAN Times*, an educational grant program, and an annual trade show.

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[5] X.400 is the international standard that defines technical specifications for computer communications under the Open Systems Interconnection model (OSI). Novell must closely adhere to these standards in order to launch a successful sales campaign.

[6] *PC Week*, "Novell Abandons Hardware Business to Push Software, " Vol. 5, No. 34 (August 22, 1988) p. 1.

The *LAN Times* was created in 1983 to inform Novell's customers about Novell's products. Published quarterly, it described the company's products and touched briefly on pressing market issues. Currently, the *Lan Times* is published monthly, and with over 50,000 subscribers, it is the most sophisticated and informative publication on the trends and issues facing LAN companies.

The Educational Grant Program was established to provide free operating systems software to colleges and universities. Depending on the number of students, an educational institution is eligible to receive several copies of NetWare to be used for instructional purposes or for research that has an instructional component.

Networld is a Novell-sponsored trade show held annually for LAN manufacturers, distributors, resellers, and end users. The show is designed to educate the market about LANs and to promote Novell's products.

Inexpensive hardware. Putting the proper tools in place has meant participating in the hardware market. Since its inception, the company has sold low-margin hardware (LAN components) as inexpensively as possible in its efforts to "grow the market." The rationale behind this strategy is explained by Jim Bills:

> *We put money into specific hardware in order to drive the cost of that hardware down in the market. Then we let someone else take it over. For us to succeed in selling our software, we have to get the cost of the workstation and all of its paraphernalia down. So we drive the market prices down more quickly than they [the competition] like.*

Aggressive Marketing

Novell's commitment to marketing cannot be understated. When the company felt its distributors were not marketing products aggressively enough, it formed NetWare Centers International (NCI), a wholly-owned sales and marketing subsidiary. An acquisition, Cache Data Systems, was the nucleus of the NetWare Center. Through its NCI subsidiary, Novell established offices worldwide for the express purpose of selling directly to end users placing orders in the range of $250,000 to $1 million. According to Craig Burton, Senior Vice President of Corporate Development, the strategy behind the establishment of these "LAN stores" was to "target accounts that its resellers have not been able to handle satisfactorily."[7]

While Novell downplayed the direct sales component of NCI and focused on the service, support and training orientation of the new centers, distributors and resellers were wary and felt that the company was "skimming the cream."

By mid-1987, Novell had established 17 NetWare Centers worldwide; 13 domestic centers and four foreign offices with full product line inventory supplies at three of the centers and limited inventory at the remaining 14 centers. According to Jim Bills:

> *We were building up sales offices. Ray [Noorda] thought it would be quicker if we we formed a separate company, purchased some of our distributors and started a distribution company which we called NetWare Centers International (NCI). Novell sold to NCI, but it just didn't work. It was a business we weren't good at. It accomplished the goal of establishing a lot of offices quickly, but when we saw it wasn't working, we shut that company down. Now the centers are still out there but they are just sales and support offices for Novell, Inc. The original intent was to grow our presence in the marketplace, to teach our distributors to be aggressive.*

Financial Activities

The financial relationship between NDSI, SSI, and Novell, Inc. is a story unparalleled by the experiences of most high tech firms. Both NDSI and Novell, Inc. have been uncommonly successful in capital formation activities. Beginning with the first infusion of seed money from SSI and continuing through four public offerings, Novell has raised more than $120 million ($8 million came from SSI investments made over a three-year period beginning in 1980).

Public Offerings

Stock. Novell has gone to the market four times in the last five years. The first time was in 1985 when SSI sold its Novell stock in a rights offering. By January 1985, Novell was doing well financially, and SSI was determined to recoup part of its investment. Due to changes in the tax law any profits made on a Novell spin-off would have been assessed the equivalent of a double tax. To resolve this problem, the company came up with the rights offering concept.

Under this arrangement, shareholders of SSI stock had the right to purchase one share of Novell stock at a price of $2.50 for every two shares of SSI stock owned. SSI offered for sale 2,250,000 shares of stock with a 100,000 over-allotment option. Furthermore, SSI was the only shareholder able to offer stock for sale. Approximately $5 million was raised, and SSI's ownership position in Novell was diluted to 24.4

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[7] *PC Week*, "Novell Opens a Chain of Retail Centers to Sell LANs Directly to Users," (May 20, 1986) p. 148.

percent. Within a year, Novell's shares were bid up close to $20.

In 1986, Novell made its first stock offering to raise capital for the company. Under the terms of the 1986 prospectus, Novell offered for sale a total of 1.2 million shares at a purchase price of $17.15 per share. In this offering the company raised approximately $21 million.

After a two-for-one stock split in 1987, Novell participated in its third public offering for the sale of 2,150,000 shares of Common Stock for $21 per share. The company raised an additional $40 million, $15 million of which was used to pay off short-term bank indebtedness and liabilities. The remaining $25 million was added to working capital.

In 1988, Novell sold $52 million of $7\frac{1}{4}$ Convertible Subordinated Debentures in an underwritten public offering. The Debentures are convertible into Novell Common Stock after December 21, 1988 and on or before September 15, 2013 at a conversion price of $36.00 per share. Exhibit 2 tracks Novell's stock transactions since the initial public offering in 1985.

Sales

Novell has experienced explosive growth over the past five years. Sales have increased at a compound annual rate of 89 percent since 1983 when sales were less than $7 million. From 1987 to 1988 sales grew 54 percent from $182.8 million to $281.1 million. Pointing to the expected growth in the LAN market throughout the next five years, industry analysts are projecting that the company's sales revenues will reach $400 million by the end of 1989, Exhibit 3.

Exhibit 3
Novell, Inc.
Sales Growth, 1984 to 1988

	Total	Growth Rate
(numbers in thousands)		
1984	17,439	207%
1985	45,181	159%
1986	96,865	114%
1987	182,800	89%
1988	281,000	54%
1989p	400,000	42%

Source: Novell, Inc. interviews with Novell personnel and Annual Reports.

Exhibit 2
Novell, Inc.
Stock Trading Activity

1988

Quarter	High	Low	EPS
I	27	$15\frac{3}{4}$	.19
II	$24\frac{1}{2}$	$17\frac{1}{2}$	.30
III	$28\frac{3}{4}$	$20\frac{3}{4}$	.39
IV	$31\frac{1}{4}$	$23\frac{1}{2}$	.20

Average Shares Outstanding: 27,752,000

1987

Quarter	High	Low	EPS
I	$18\frac{1}{8}$	$10\frac{3}{8}$	.17
II	$25\frac{1}{4}$	$16\frac{3}{4}$	.18
Two for One Stock Split			
III	27	18	.20
IV	$29\frac{1}{4}$	$11\frac{1}{2}$	.23

Average Shares Outstanding: 26,181,000

1986

Quarter	High	Low	EPS
I	10	$6\frac{5}{8}$	.10
II	10	7	.11
III	$10\frac{5}{8}$	$8\frac{1}{2}$	.11
IV	$11\frac{7}{8}$	$8\frac{5}{8}$	.16

Average Shares Outstanding: 24,941,000

1985

Quarter	High	Low	EPS
I	5	$4\frac{3}{4}$	.07
II	$7\frac{7}{8}$	$4\frac{1}{2}$	.04
III	$10\frac{1}{4}$	$7\frac{1}{4}$	.06
IV	$15\frac{1}{4}$	$9\frac{3}{4}$	.07

Average Shares Outstanding: 23,145,000

Note: All stock transactions and ratios reflect the stock split.
Source: Calculated by the Bureau of Economic and Business Research using data obtained from Novell's Annual Reports.

Employment Profile

Novell, Inc. presently employs approximately 1,600 people. About 1,000 of these employees work at one of the two facilities located in Utah. The remaining 600 are employed at one of three out-of-state companies purchased by Novell within the past two years, or at sales offices located throughout the world, Exhibit 4.

Exhibit 4
Novell, Inc.
Employment Growth, 1984 to 1988

	Utah	Non-Utah	Total
1984[a]	10	0	10
1984	62	35	97
1985	194	42	236
1986	372	135	507
1987	620	538	1,158
1988	1,000	600	1,600

[a] Employment from January 1984 through October 1984.

Source: Personnel Department, Novell, Inc. 1988.

Since January 1984, Novell's employment growth has averaged more than 100 percent per year. Employment growth in Utah, while increasing significantly, has begun to slow in comparison with increases in non-Utah employment. Novell's recent acquisition of three domestic subsidiaries (CXI, Inc., and Santa Clara Systems in California; SoftCraft, Inc. in Texas) and the establishment of NetWare Centers in 21 states have resulted in rapid growth rates in employment outside the state. This trend may well continue as the company anticipates future growth in its direct sales and marketing areas.

With the exception of a few senior and support people involved in sales and marketing, such activities are undertaken outside of Utah (Novell's NetWare Center's operation is located in St. Louis, Missouri). Furthermore, the demand for increased support for the company's field offices and non-Utah locations may skew employment growth toward the non-Utah facilities. Employment growth in Utah will most likely occur in the product development-related areas.

Two major components of Novell's work force are administration and product development. All administrative functions are undertaken locally. Essentially all software development and development-related production activities are also conducted at the company's headquarters in Provo, Utah. This will continue to be the case, although the company has moved the bulk of its hardware development activity to its Santa Clara-based acquisition.

Technical employees (computer scientists, engineers, and technicians with at least a two-year degree) make up nearly 15 percent of the work force. In general, the company's professional engineering, software, and computer science positions are filled by engineers with graduate degrees. Technicians work in support positions for software engineering and quality assurance.

Administration and development account for 37 percent of the company's local employment. More than half of the Utah-based labor force has been hired from the local labor pool. The company recruits at local universities and colleges. Employee turnover at Novell has typically been below 5 percent.

Why Utah?

Novell Data Systems, Inc. was initially established in Utah because three of the founders (Jack Davis, Rusty Woodbury and Frank Richins) lived in the state and wanted to stay. However, over the years the company has had ample opportunity to leave, but Novell's management made the decision early on the keep the company in Utah. According to Graig Taylor, Novell's Director of Government Relations:

> *We think Utah is a darn good place to do business. Novell had the opportunity to move when we first formed from Novell Data Systems to Novell, Inc. Ray invited all the remaining employees in and said: "Where do we want to live when we grow up? Do you want to move to Salt Lake, or do we want to stay here in Provo? Do we want to go to Silicon Valley, or somewhere else; to the mountains, or someplace exotic?" So the location was really ours and the choice was conscientiously made to stay in Utah.*

Advantages

"People" are the most important factor in Novell's decision to remain in Utah. "The state has an abundant supply of labor and those people have a strong work ethic" was a sentiment expressed by many of Novell's top management. Furthermore, Novell's employees represent a dedicated work force that is willing to work hard for the company. To substantiate this claim, Novell's Human Resources Director, Bruce Hammond points to a turnover rate that averages less than 5 percent annually.

Another major advantage is the high quality of life offered in Utah. In addition to the recreational and cultural amenities, the state is perceived as a good place to raise a family.

Affordable housing for most of Novell's employees is also readily available. (This has not been the case for single, non-college, apartment-hunting employees.) Moreover, although some of Novell's non-Utah recruits initially expressed a hesitancy to relocate, once they get here they enjoy Utah's recreational and cultural offerings.

According to the company's CFO, Ron Eliason, "Costs (of doing business) are clearly lower, from the real estate and facility costs to the people costs." While many companies in the Los Angeles and Boston areas are paying high prices for land and office space, Utah offers both at a very reasonable price.

Limitations

Doing business in Utah also has its drawbacks. One of the greatest challenges facing Novell is finding enough high-level professionals with LAN experience to meet the demands imposed by its rapid growth. This is a multifaceted problem. First, there seems to be a severe shortage of high level managers in Utah. The entry-level technicians coming out of the universities are well-trained, but when it comes time to fill a mid-level or top management position, Novell (as well as other high tech companies) must recruit out-of-state.

Aggravating this situation is the fact that the company needs a very specific type of manager---one with LAN experience. In a field that is still in its infancy, such experience is difficult to find even in high tech areas and almost impossible to find in Utah. Enticing these individuals to the state poses yet another problem due to the number of technical employment alternatives. The technology job market in Utah is limited; whereas in Boston or Los Angeles, if a person is unhappy in one job there are five more waiting. In terms of employment, the predicament posed by Utah's isolation from major urban areas is summed up by Graig Taylor:

> *In Utah if something happens, either you don't like the job or the company doesn't like you, and you fall out of the nest, it is a long fall before someone catches you. On the other hand, in Los Angeles or Boston, that fall is very short.*

The perception that Utah is dominated by the LDS church also makes it difficult to recruit from outside the state. Utah's remoteness is another limitation. The state is far removed from other high tech and financial regions. This makes it difficult for Novell to get coverage from the financial world, or for the state to develop a core of technology companies that would alleviate some of the employment problems. Marketing and training activities have also been hampered. To counteract this, Novell has established training facilities throughout the world.

Conclusions

Novell's present success is the culmination of many smaller successes that occurred both before and after the company's organization in 1983. It is a study of Jack Davis (entrepreneur/promoter) and Raymond Noorda (entrepreneur/manager).

Jack Davis very successfully sold his abilities, his idea, and his team. This capability helped him raise the capital to develop the software product for which Novell has become acclaimed. Another success was the ability of the early company to design and manufacture a complex system on a shoestring budget.

Amid all discussions of Novell's success, one question remains: "Why was NDSI unable to become a Novell?" There is really no single answer. Rather, NDSI's failure followed a series of events that in some cases were beyond the founders' control.

Overselling the group's abilities and underestimating the time required to develop the networking system were two of the foremost problems. Davis, a remarkable promoter, convinced Safeguard to finance his fledgling company. In return, he promised to deliver a highly technical product within a short period of time. At one point, NDSI had three major development efforts ongoing. Conflicts and ego clashes between development leaders caused rifts throughout the company. These conflicts eventually created an "underground" at the company headed by the SuperSet consulting group. George Canova, NDSI's president, could not provide the leadership necessary to move the NDSI's team development efforts in the same direction. Each group had its own hidden agenda. As Jim Bills explained:

> *NDSI had too many people running the company on questionable credentials. Davis promoted this company as a group of experts...and the chiefs had more ego than substance. George Canova had good business sense, but I don't think anybody else in a leadership position had a good sense of business. Although a few people understood the value of SuperSet's software, they did not have the authority to do anything about it.*

As a result, by the time the software was developed, NDSI had missed its window of opportunity. Competitors were manufacturing and selling a better model of NDSI's printer at a lower cost. The rest of the system was too sophisticated and expensive for what the average customer needed.

Another contributing factor was the nature of the investing company. A typical venture firm realizes that investments in high tech companies are long term investments. SSI, on the other hand, was not a patient investor and although SSI's money was important to the fledgling firm, it may not have been the best partner for the company. SSI (partly due to Davis' promotional efforts) expected to recoup its investment in a relatively short period of time. When these expectations were not met, the solution was to change management. Consequently, NDSI was without leadership for much of its early life. The investment mindset of SSI resulted in NDSI's shipping an untested product--a situation that proved to be a fatal blow when products were returned and sales stopped.

Since 1983, Raymond Noorda has been the driving force behind Novell. Focus, experience, and motivation are the key components in his strategy of turning Novell into a multi-million dollar organization. He decided that Novell would be a software company, and every activity from that point on was focused toward the achievement of that objective.

Using his managerial expertise and the productive components of NDSI, he brought focus and direction to Novell. Where NDSI's leadership was unable to define the product or the market for that product, Noorda developed a business strategy that was broader than simply the development and distribution of product. He understood the importance of marketing a fully-developed product to an audience that understood that product. Instead of three or four unrelated development projects, Novell's research and development efforts centered on the enhancement of NetWare--the operating system software product now considered the de facto standard in the networking market.

Noorda's technical background combined with managerial experience has enabled him to anticipate trends in the networking market and to move his company in the proper direction to meet the demands of the market quickly and effectively. This has required several major corporate reorganizations (the most recent stemming from the decision to phase-out the hardware component of Novell's product line). Finally, and perhaps most importantly, Noorda brought with him a vision of Novell's potential. As a leader, he conveyed that vision to his people earning their dedication and loyalty. Starting with 15 people in 1983, he has "grown" a group of 1,600 competent, motivated employees.

Noorda's efforts and strategies have paid off. Today, Novell is acclaimed as the pioneer of the LAN market. With more than 60 percent of the U.S. networking market and sales in 1988 of $281 million, it is the largest independent provider of networking products in the country. Much of Novell's explosive growth has come from sales of NetWare software.

This segment accounted for 60 percent of the company's revenues in 1988, up from 43 percent in 1987. Software sales are highly profitable for Novell and will continue to account for the fastest growing portion of the company's business. This trend will accelerate as Novell phases out most of its hardware products. As a software company, Novell can work profitably with LAN hardware companies that previously viewed Novell as a competitor.

This success will not be easy to maintain. The market for networking has grown dramatically over the course of the past five years. The sheer growth of the market has put severe pressure on the management structures of every major LAN company. In the wake of this growth, competition has become fierce and the technological requirements enormous. Though NetWare is an eighth generation product, other companies are developing products that will match NetWare's capabilities.

One of the darkest threats to Novell's market share is the joint venture between 3Com Corporation and MicroSoft, Inc. to develop the LAN Manager---a software product that has been hailed as a direct competitor for Novell's NetWare. Technologically, networking is becoming more demanding, especially in multivendor support (the ability for one operating system product to simultaneously network diverse hardware components).

Essentially, the networking market is maturing, and a mature market is unforgiving. Mistakes that are easily rectified in a young market can mean death in a mature one. Moreover, as this maturation proceeds, the demands of the market will take on a different character. For example customer support is playing a larger role in the choice of LAN products. This, combined with the demand for multivendor support, will eventually put smaller LAN companies out of business.

Will Novell survive these changes? Experts in the LAN market claim that Novell will always be on the networking scene. Novell is a company that has built the networking market from the ground floor. Novell has shown a remarkable capacity to assimilate market changes, and to move the market in a favorable direction.

Utah Business Statistics

UTAH DATA	Nov. 1987	Nov. 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,603	21,116	7.7%	20,189	18,914	6.7%
New Corporations (no.)	397	415	4.5%	454	464	-2.3%
New Car, Truck and Motor Home Sales (no.)	4,632	4,750	2.5%	5,213	5,028	3.7%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	64.00	68.20	6.6%	67.56	63.08	7.1%
Lambs (cwt)	68.80	62.30	-9.4%	64.29	72.45	-11.3%
Milk Wholesale (cwt)	12.20	12.60	3.3%	11.59	11.98	-3.2%
Alfalfa Hay, Baled (per ton)	70.00	77.00	10.0%	75.00	66.75	12.4%
Cattle Slaughtered (live weight) (thous. of lbs.)	39,962	43,069	7.8%	46,479	41,451	12.1%
Construction						
Total Construction (thous. of dol.) 1	66,260	98,333	48.4%	120,669	117,219	2.9%
Residential	32,099	51,433	60.2%	47,332	49,635	-4.6%
Nonresidential	22,441	27,527	22.7%	41,723	39,144	6.6%
Public Works and Utilities	11,720	19,373	65.3%	31,650	28,440	11.3%
Total Permit Construction (thous. of dol.) 2	90,238.9	59,117.1	-34.5%	70,500.0	94,776.7	-25.6%
Residential	29,109.2	28,313.2	-2.7%	34,427.5	42,735.0	-19.4%
Nonresidential	48,999.1	21,999.3	-55.1%	22,925.0	38,148.7	-39.9%
Additions, Alterations and Repairs	12,130.6	8,804.6	-27.4%	13,147.5	13,893.0	-5.4%
New Dwelling Units (no.)	413	388	-6.1%	475	641	-25.9%
Employment						
Civilian Labor Force (thous.)	757.3	782.4	3.3%	757.2	756.3	0.1%
Total Employed Persons	715.1	744.0	4.0%	718.9	708.3	1.5%
Unemployed Persons	42.2	38.4	-9.0%	38.3	48.1	-20.4%
Percent Total Labor Force	5.6	4.9	-12.5%	5.1	6.4	-20.5%
Employees on Nonagricultural Payrolls (thous. of jobs)	653.9	676.8	3.5%	654.2	639.5	2.3%
Manufacturing	96.2	100.2	4.2%	96.8	92.0	5.2%
Mining	8.4	8.0	-4.8%	8.3	8.0	4.0%
Contract Construction	26.5	26.5	0.0%	24.4	27.1	-10.0%
Transportation, Communication and Utilities	38.8	40.7	4.9%	39.1	37.8	3.5%
Wholesale Trade	34.7	35.1	1.2%	34.6	35.0	-1.1%
Retail Trade	121.4	125.3	3.2%	119.2	117.9	1.1%
Finance, Insurance and Real Estate	33.4	32.9	-1.5%	33.5	33.7	-0.5%
Services 3	150.9	162.3	7.6%	156.2	146.1	6.9%
Federal Government	39.0	39.4	1.0%	39.5	39.9	-1.1%
State Government 4	39.2	39.5	0.8%	36.5	38.0	-3.8%
Local Government 4	65.4	66.9	2.3%	64.7	63.8	1.3%
Average Weekly Hours						
Manufacturing	41.5	41.2	-0.7%	40.6	39.5	2.8%
Mining	40.8	39.4	-3.4%	42.7	41.2	3.7%
Wholesale Trade	38.4	36.7	-4.4%	37.7	38.0	-0.8%
Retail Trade	27.7	27.8	0.4%	28.1	28.1	0.3%
Amount of Unemployment Compensation (thous. of dol.)	4,697.0	4,622.4	-1.6%	5,949.1	8,069.2	-26.3%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,475.9	2,376.9	-4.0%	2,343.4	2,452.8	-4.4%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	272,882.3	259,545.4	-4.9%	146,489.8	138,260.7	6.0%
Sales and Use Tax	131,810.9	130,990.2	-0.6%	53,142.6	47,674.3	11.5%
Motor Fuel Tax	9,748.5	10,856.8	11.4%	11,027.0	9,252.7	19.2%
Individual Income Tax	81,297.9	65,492.4	-19.4%	52,536.4	48,516.9	8.3%
Corporation Franchise Tax	835.4	(122.7)	-114.7%	5,885.3	6,274.4	-6.2%
Production						
Net Electric Power Utilized (mil. of kwh)	1,138.0	1,267.2	11.4%	1,247.8	1,151.5	8.4%
Crude Oil to Refineries (thous. of bbls.)	3,952.5	4,400.2	11.3%	4,219.0	3,807.0	10.8%
Crude Oil (thous. of bbls.)	2,859.7	2,567.6	-10.2%	2,783.8	2,974.1	-6.4%
Natural Gas (mil. of cu. ft.)	24,208.9	23,883.8	-1.3%	23,066.9	21,525.5	7.2%
Coal (thous. short tons)	1,513.0	1,478.0	-2.3%	1,508.0	1,191.4	26.6%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	723,509	765,585	5.8%	864,979	843,839	2.5%
Highway Traffic Count Across State Lines	32,080	34,597	7.8%	NA	38,062	NA
Transient Room Taxes (thous. of dol.)	1,861.8	1,683.7	-9.6%	548.9	520.4	5.5%
Visits, State, Nat'l. Parks, Monuments (thous.)	359.9	391.8	8.9%	1,104.2	1,061.0	4.1%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	484,272	493,200	1.8%	487,856	479,314	1.8%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	177,709	183,298	3.1%	180,583	175,315	3.0%
Electric Customers (Residential)	474,256	479,042	1.0%	476,318	472,427	0.8%
Electric Customers (Commercial)	46,171	47,097	2.0%	46,768	46,209	1.2%
Natural Gas Customers (Residential & Commercial)	448,067	460,145	2.7%	458,321	445,808	2.8%
Natural Gas Customers (Industrial)	550	558	1.5%	549	555	-1.1%

Utah Business Statistics

UTAH DATA	Nov. 1987	Nov. 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.2r	53.5fo	2.5%	52.4	52.3	0.3%
Unemployment Rate	4.9r	4.7	-4.1%	4.5	5.4	-16.9%
Auth. Permit Construction (thous. of dol.)	9.151.4	7,442.6	-18.7%	9,266.8	12,769.4	-27.4%
New Dwelling Units (no.)	59	51	-13.6%	68	94	-27.8%
Postal Receipts (thous. of dol.)	282.0	463.3	64.3%	421.7	NA	NA
Electric Customers (Residential)	47,813	48,101	0.6%	48,063	47,185	1.9%
Electric Customers (Commercial)	3,309	3,550	7.3%	3,445	3,277	5.1%
Natural Gas Customers (Residential)	49,216	50,728	3.1%	50,273	48,704	3.2%
Natural Gas Customers (Industrial)	52	53	1.9%	53	52	1.3%
Telephone Lines in Service (Mt. Bell)(Residential)	54,511	55,872	2.5%	55,238	54,757	0.9%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,722	11,577	8.0%	11,265	10,510	7.2%
Salt Lake County						
Non-Ag. Employment (thous.)	339.1r	350.9fo	3.5%	338.9	332.9	1.8%
Unemployment Rate	5.1r	4.5	-11.8%	4.8	5.5	-13.7%
Auth. Permit Construction (thous. of dol.)	54,022.2	23,274.3	-56.9%	30,194.8	46,292.0	-34.8%
New Dwelling Units (no.)	152	140	-7.9%	179	251	-28.5%
Postal Receipts (thous. of dol.)	8,996.0	8,683.2	-3.5%	7,905.3	7,309.1	8.2%
Electric Customers (Residential)	237,634	241,208	1.5%	239,450	236,145	1.4%
Electric Customers (Commercial)	20,169	20,438	1.3%	20,376	19,905	2.4%
Natural Gas Customers (Residential)	215,853	220,377	2.1%	220,589	216,977	1.7%
Natural Gas Customers (Industrial)	235	238	1.3%	236	241	-2.1%
Telephone Lines in Service (Mt. Bell)(Residential)	228,513	232,007	1.5%	229,998	226,529	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,054	111,620	1.4%	110,900	109,746	1.1%
Utah County						
Non-Ag. Employment (thous.)	79.3r	82.9fo	4.5%	76.7	73.9	3.9%
Unemployment Rate	5.4r	4.0	-25.9%	4.5	7.1	-36.2%
Auth. Permit Construction (thous. of dol.)	8,108.8	8,401.2	3.6%	10,335.5	12,450.3	-17.0%
New Dwelling Units (no.)	77	41	-46.8%	65	93	-30.3%
Postal Receipts (thous. of dol.)	922.5	1,336.4	44.9%	1,164.8	929.0	25.4%
Electric Customers (Residential)	51,386	52,318	1.8%	52,224	51,922	0.6%
Electric Customers (Commercial)	5,856	6,055	3.4%	5,976	6,309	-5.3%
Natural Gas Customers (Residential)	60,626	61,807	1.9%	61,652	60,223	2.4%
Natural Gas Customers (Industrial)	69	71	2.9%	68	68	-0.2%
Telephone Lines in Service (Mt. Bell)(Residential)	64,250	65,906	2.6%	64,547	62,345	3.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,509	20,993	7.6%	20,040	18,521	8.2%
Weber County						
Non-Ag. Employment (thous.)	60.7r	62.5fo	3.0%	61.2	60.3	1.5%
Unemployment Rate	6.7r	6.1	-9.0%	5.9	7.1	-16.9%
Auth. Permit Construction (thous. of dol.)	6,264.8	4,426.1	-29.3%	5,646.5	8,484.6	-33.5%
New Dwelling Units (no.)	47	49	4.3%	47	69	-31.1%
Postal Receipts (thous. of dol.)	583.6	694.9	19.1%	668.9	610.2	9.6%
Electric Customers (Residential)	53,090	53,621	1.0%	53,482	52,761	1.4%
Electric Customers (Commercial)	4,877	4,876	0.0%	4,924	4,839	1.7%
Natural Gas Customers (Residential)	48,891	49,534	1.3%	49,743	48,956	1.6%
Natural Gas Customers (Industrial)	85	86	1.2%	83	85	-1.8%
Telephone Lines in Service (Mt. Bell)(Residential)	46,043	46,822	1.7%	46,432	45,929	1.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,288	12,114	7.3%	11,811	10,962	7.7%

NA Not Available   r Revised   fo Forecast

Sources:

Personal Income: Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations: Utah Secretary of State.
New Car and Truck Sales: Utah State Tax Commission, Economic and Statistical Unit.
Agriculture: U.S. Department of Agriculture, Agriculture, Utah: Utah Crop and Livestock Reporting Service.
Construction Data: F.W. Dodge Statistics and Utah Construction Report, Bureau of Economic and Business Research.
Employment Data: Utah Department of Employment Security.
Savings Information: Utah Savings and Loan Institutions.
Tax Collections: Utah State Tax Commission.
Net Electric Power Utilized: Cooperating Utah Power Companies.
Crude Oil Production: Area Oil Refineries.
Natural Gas Production: Utah Department of Oil, Gas, and Mining.
Coal Production: U.S. Department of Energy.
Air Passengers: Salt Lake City International Airport, Statistics Division.
Highway Traffic Count: Utah Department of Transportation.
Visits to State and National Parks and Monuments: U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data: Cooperating Utah Utility Companies.
Postal Receipts: Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Footnotes:

1 Obtained from F.W. Dodge Statistics.
2 Obtained from Utah Construction Report.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

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NATIONAL DATA	Nov. 1987	Nov. 1988	% Change From Year Ago	[illegible]	[illegible]	[illegible]
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,662.8	[illegible]	7.2%	[illegible]	[illegible]	[illegible]
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,884.1	4,165.2	7.2%	[illegible]	[illegible]	[illegible]
Industrial Production Indexes (seasonally adjusted) (1977=100)	133.2	139.9	[illegible]	[illegible]	[illegible]	[illegible]
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	406.8	445.7	[illegible]	[illegible]	[illegible]	[illegible]
Index of Leading Indicators (1982=100)	139.3	143.9	[illegible]	[illegible]	[illegible]	[illegible]
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	115.4	120.3	4.2%	[illegible]	[illegible]	[illegible]
CPI-U (All Urban Consumers) Food & Beverages	114.3	120.2	5.2%	[illegible]	[illegible]	[illegible]
CPI-U (All Urban Consumers) Housing	115.5	119.9	[illegible]	[illegible]	[illegible]	[illegible]
CPI-U (All Urban Consumers) Transportation	107.8	110.7	2.7%	[illegible]	[illegible]	[illegible]
CPI-U (All Urban Consumers) Medical Care	132.8	141.6	[illegible]	[illegible]	[illegible]	[illegible]
CPI-U (All Urban Consumers) Energy	89.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	106.3	109.7	[illegible]	[illegible]	[illegible]	[illegible]
GNP Price Deflator (1982=100) (qtly.)	118.9	124.0	[illegible]	[illegible]	[illegible]	[illegible]
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	120.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Civilian Employment (mil.)	113.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Unemployment Rate	5.9	5.4	[illegible]	[illegible]	[illegible]	[illegible]
Construction						
Total Construction (mil. of dol.)	18,662.6	18,601.2	[illegible]	[illegible]	[illegible]	[illegible]
Residential	8,431.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nonresidential	7,281.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Non-Building	2,949.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
New Dwelling Units (no.)	107,970	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Interest Rates						
Short Term (3-month Treasury bill rate)	5.81	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Long Term (30-year Treasury bond yields)	8.99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	8.78	10.05	[illegible]	[illegible]	[illegible]	[illegible]
Mortgage Rates (new homes)	8.92	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Sources: Business Conditions Digest, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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1988: A YEAR OF IMPRESSIVE GROWTH FOR MOST UTAH COUNTIES

Austin Sargent, Research Analyst

This issue of the *Utah Economic and Business Review* presents annual selected business statistics for each of Utah's 29 counties and for the state as a whole. These statistics are presented as indicators of economic activity occurring in each county. The 17 indicators fall into six major categories: Population, Labor Market and Income Data, Tax Data, Construction Activity, and two miscellaneous items -- New Car and Truck Sales and "in lieu tax payments" made to states under provisions of federal Public Law 94-565.

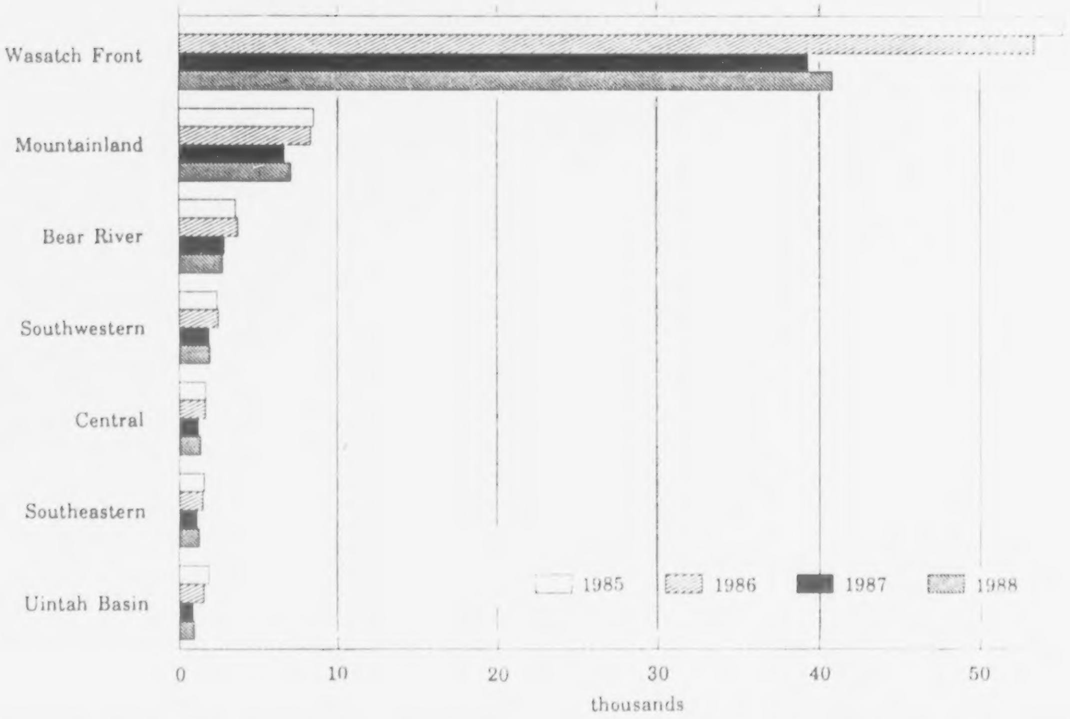
Utah's counties experienced a substantial level of increased economic activity in 1988 compared to 1987. The state had a slight increase in population while employment and wages, and gross taxable sales showed considerable improvement. New car and truck sales state-wide also improved over 1987 as shown in Figure 1. Construction activity, which decreased in 1987, continued to decrease significantly in 1988.

Twenty-two counties showed increased activity in the majority of economic indicators. Daggett and Summit counties had the most consistent growth while Millard and Morgan showed the fewest improvements among the indicators. The Wasatch Front, Mountainland, Southwest, Central and Bear River multi-county districts showed the most improvement in 1988, according to the indicators; while the Southeastern and Uintah Basin districts again experienced slower growth during the year. Decreased activity in oil, gas and mining continued to slow economic growth in these two regions. A summary of the percent change in six economic indicators for counties and multi-county districts is shown in Table 1.

Population

Utah's population was estimated at 1,695,000 for 1988, an increase of 0.9 percent over 1987. Washington county had the highest population growth rate at 4.1 percent, followed by Davis at 2.8 percent. Cache and

Figure 1
New Car and Truck Sales in Utah
by Multi-County District, 1985-88



Wayne counties also had population increases of 2 percent of more. Rich county had a 5.1 percent decrease in population in 1988, while Duchesne county's population decreased 4.4 percent. Beaver, Carbon, Emery and Grand all experienced a decrease in population of 2 percent or more. (More detailed information on population is contained in the December 1988 issue of the *Utah Economic and Business Review.*)

Employment and Wages

The improved economic growth experienced in 1988 is shown by the growth in nonagricultural employment and wages. Employment in Utah rose 2.8 percent while wages increased 3.5 percent in 1988. Rich county led the state with an increase of 12.8 percent in nonagricultural employment, followed by Wasatch (9.6), Juab, (8.6) and Utah (7.6) counties. Duchesne (-8.2) and Millard (-8.0) had the largest decreases in employment. Increased or decreased nonagricultural employment by county for 1988 is shown in Figure 2. Wages increased 21 percent in Wasatch county due primarily to the Jordanelle Dam Project, and 10.2 percent in Summit county. Wayne county had a 8.9 percent decrease while Duchesne county experienced a 7.2 percent decrease.

Income

Total personal income in Utah reached $20,315.3 million in 1988, an increase of 6.2 percent over 1987. Per capita income improved 5.3 percent in 1988 to $11,985. Total personal income and per capita income figures by county are available through 1987 and are shown in the detail tables. Summit county had the highest per capita income in 1987 among Utah counties, at $15,906. San Juan had the lowest per capita income in 1987 at $7,414. Salt Lake county accounted for 47 percent of the total personal income in the state in 1987.

Taxes

Property taxes collected in 1988 were down -0.3 percent in 1988 compared to 1987.

Summary Table 1

1988 Population and Six Other Economic Indicators

Percent Change by County and Multi-County District
1987-1988

	Population							
	1988 Estimate	Percent Change 1987-88	Average Monthly NonAg Employment	Average Monthly NonAg Wage	Property Taxes Charged*	Gross Taxable Sales	Number of New Dwelling Units	Value of Total Construction
Bear River	**110,450**	**1.4**	**4.4**	**1.7**	**-2.2**	**4.5**	**-19.8**	**13.7**
Box Elder	38,000	0.5	5.6	0.2	-1.5	-0.7	-30.7	-15.1
Cache	70,600	2.0	3.6	2.9	-3.1	7.9	-11.2	34.2
Rich	1,850	-5.1	12.8	-3.6	1.0	-11.8	--	--
Central	**54,850**	**0.1**	**0.0**	**1.1**	**-0.4**	**57.4**	**-7.4**	**-19.8**
Juab	5,700	0.0	8.6	8.6	-2.3	-16.2	333.3	29.5
Millard	12,900	-0.8	-8.0	4.6	-0.4	372.0	-40.0	-56.0
Piute	1,550	0.0	-3.1	-1.6	1.1	-6.9	-50.0	-28.6
Sanpete	16,700	0.6	3.8	0.5	-0.2	-1.0	-13.9	19.1
Sevier	15,900	0.0	0.6	0.5	-0.2	0.0	-16.7	-42.9
Wayne	2,100	2.4	-2.7	-8.9	2.8	11.9	50.0	245.3
Mountainland	**285,200**	**1.5**	**7.4**	**7.9**	**-1.1**	**8.8**	**-17.3**	**-7.7**
Summit	13,400	0.8	5.3	10.3	-2.0	8.5	16.0	28.1
Utah	262,000	1.6	7.6	7.4	-0.7	8.8	-27.0	-15.5
Wasatch	9,800	1.0	9.6	21.0	-0.1	10.1	--*	--*
Southeastern	**52,750**	**-1.8**	**0.2**	**1.6**	**-0.4**	**5.5**	**-22.2**	**-25.1**
Carbon	22,000	-2.2	-0.2	1.1	0.1	1.6	-35.5	-32.4
Emery	11,300	-2.6	-2.0	0.5	-0.7	18.8	-57.1	32.9
Grand	6,550	-2.2	0.8	4.4	2.1	20.7	125.0	-33.0
San Juan	12,900	0.0	3.3	5.5	-1.3	-7.7	0.0	11.9
Southwestern	**75,950**	**1.8**	**4.5**	**3.9**	**-1.4**	**9.3**	**-5.6**	**-2.8**
Beaver	4,800	-2.0	-0.5	5.3	2.1	19.3	100.0	-37.2
Garfield	4,050	0.0	4.5	3.7	2.5	11.2	-17.4	-22.4
Iron	19,200	-1.5	2.2	4.0	-5.3	7.3	36.0	12.0
Kane	4,900	1.0	6.2	4.3	2.1	13.3	-3.4	-2.6
Washington	43,000	4.1	6.2	3.8	-0.6	8.8	-7.5	-3.9
Uintah Basin	**35,300**	**-2.5**	**-2.1**	**-2.8**	**2.3**	**2.3**	**-50.0**	**59.9**
Daggett	700	0.0	0.6	4.3	9.0	42.6	--	-3.9
Duchesne	13,100	-4.4	-8.2	-7.2	1.8	-7.8	-58.1	60.9
Uintah	21,500	-1.4	1.4	-1.0	2.3	6.7	0.0	60.9
Wastach Front	**1,080,500**	**0.9**	**2.0**	**3.4**	**-0.1**	**5.2**	**-25.4**	**-28.3**
Davis	184,000	2.8	0.6	3.8	1.3	5.1	-24.8	-26.8
Morgan	5,700	0.9	-0.9	-0.6	-0.5	-4.1	-23.1	164.8
Salt Lake	705,000	0.6	2.1	3.6	-0.3	5.7	-23.7	-28.5
Tooele	27,800	-1.1	1.2	-1.0	-0.3	6.8	-14.3	-12.5
Weber	158,000	0.6	2.7	3.7	0.2	2.7	-33.0	-35.6
State Totals	**1,695,000**	**0.9**	**2.8**	**3.5**	**-0.3**	**6.8**	**-21.8**	**-21.3**

---

[*] Comparable data are not available due to under-reporting of construction activity in 1987.

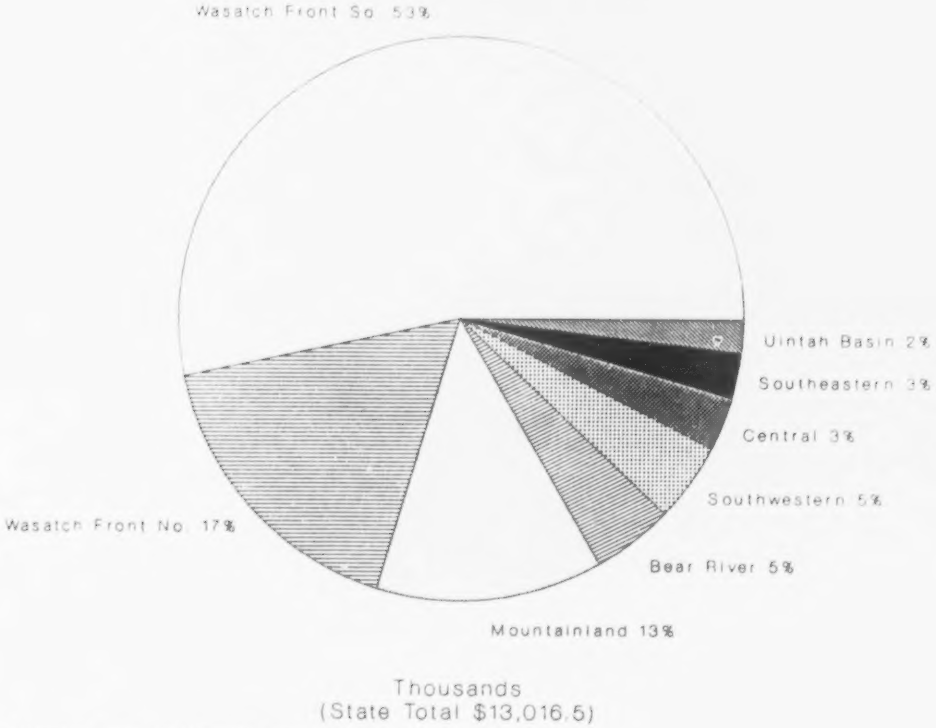
Source: Selected Business Statistics for Utah Counties.

This reflects overall lower assessed valuations of property due to changing market conditions. Daggett county had the largest increase in property taxes charged, increasing 9 percent; and Iron county experienced the largest decrease (-5.3 percent). Gross taxable sales increased 6.8 percent in Utah in 1988 to $13,016.5 million. Salt Lake county accounted for 49.9 percent of the total gross taxable sales revenues. Millard county had the largest increase in gross taxable sales (372 percent) due to sales of electrical power. Juab county's gross taxable sales collections fell 16.2 percent, the largest decrease in the state. The percent change in gross taxable sales by county, appears in Figure 3; and the percent distribution of 1988 gross taxable sales by multi-county district is presented in Figure 4.

Construction

Though the economy in Utah improved in most areas in 1988, construction activity continued a sharp decline. The total value of construction fell 21.3 percent during 1988. Nonresidential construction values decreased 34.2 percent, while the value of residential construction declined 16.6 percent. The number of new dwelling units authorized in 1988 decreased 21.8 percent to 5,715 units. All seven multi-county districts reported decreases in the number of new dwelling units authorized. Bear River and Uintah Basin were the only multi-county districts to show an increase in total construction value in 1988 compared to 1987. (Detailed statistics relative to construction activity in the communities and counties of Utah are contained in the *Utah Construction Report* published quarterly by the Bureau of Economic and Business Research.)

Figure 4
Distribution of Gross Taxable Sales in Utah
By Multi-County District, 1988



Wasatch Front Multi-county District split with Salt Lake and Tooele in the South and Davis, Weber, Morgan the North

Figure 2

Average Non-Agricultural Employment

Percent Change 1987-1988

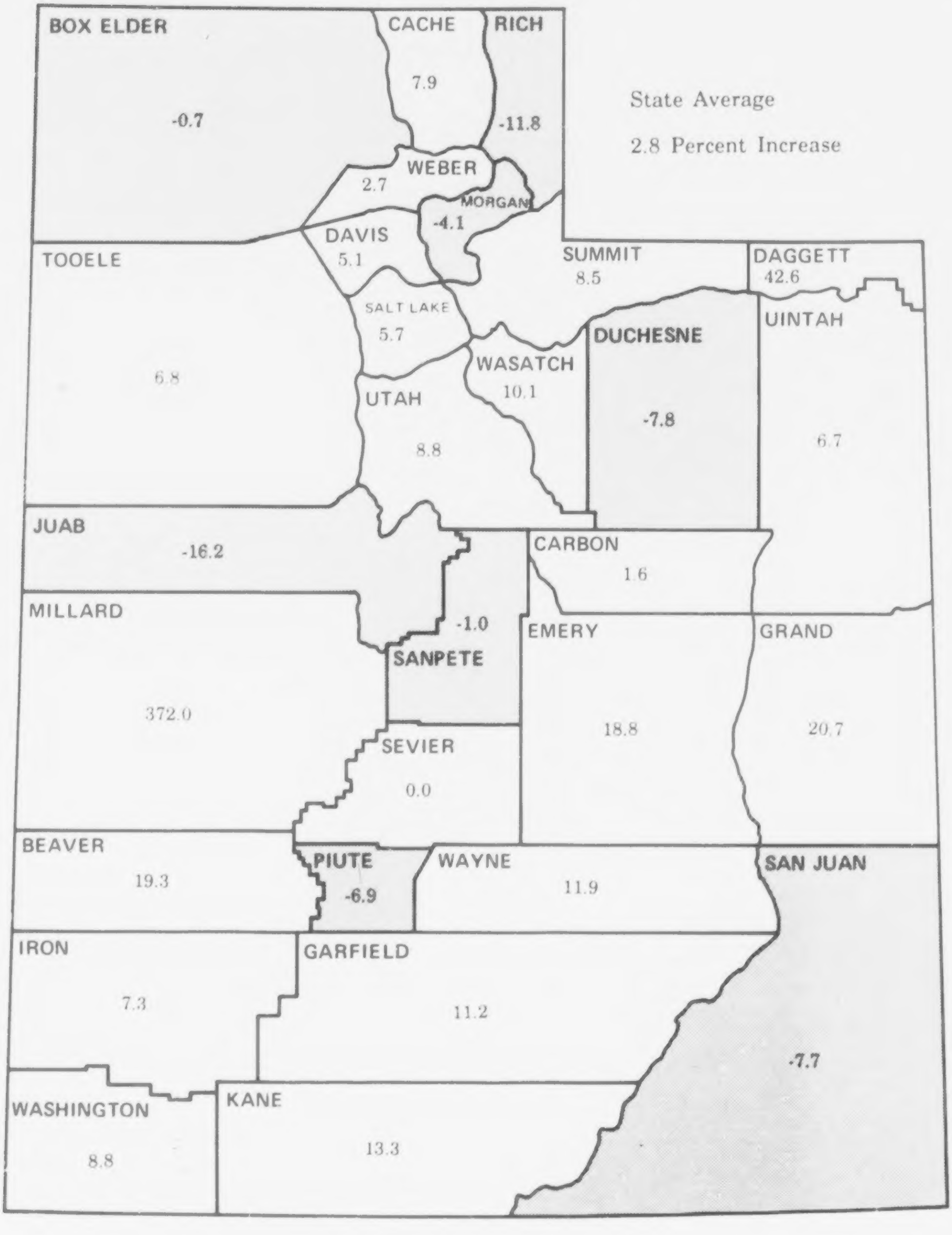
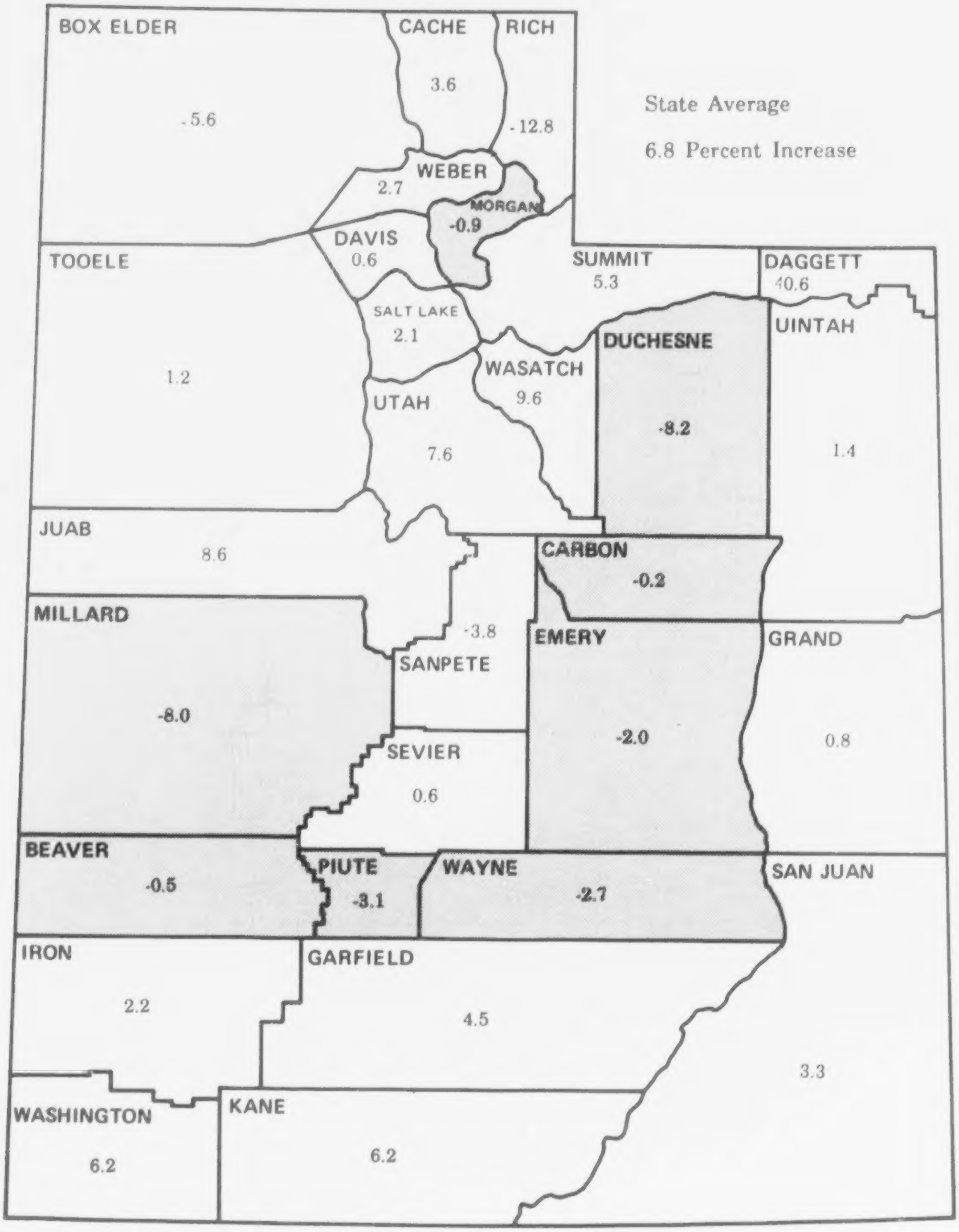

BOX ELDER
-0.7
CACHE
7.9
RICH
-11.8
State Average
2.8 Percent Increase
WEBER
2.7
MORGAN
-4.1
DAVIS
5.1
TOOELE
6.8
SUMMIT
8.5
DAGGETT
42.6
SALT LAKE
5.7
UINTAH
6.7
DUCHESNE
-7.8
WASATCH
10.1
UTAH
8.8
JUAB
-16.2
CARBON
1.6
MILLARD
372.0
SANPETE
-1.0
EMERY
18.8
GRAND
20.7
SEVIER
0.0
BEAVER
19.3
PIUTE
-6.9
WAYNE
11.9
SAN JUAN
-7.7
IRON
7.3
GARFIELD
11.2
WASHINGTON
8.8
KANE
13.3

Figure 3
Gross Taxable Sales
Percent Change 1987-1988



BOX ELDER
-5.6
CACHE
3.6
RICH
-12.8
State Average
6.8 Percent Increase
WEBER
2.7
MORGAN
-0.9
DAVIS
0.6
TOOELE
1.2
SUMMIT
5.3
DAGGETT
40.6
SALT LAKE
2.1
UINTAH
1.4
DUCHESNE
-8.2
WASATCH
9.6
UTAH
7.6
JUAB
8.6
CARBON
-0.2
MILLARD
-8.0
SANPETE
-3.8
EMERY
-2.0
GRAND
0.8
SEVIER
0.6
BEAVER
-0.5
PIUTE
-3.1
WAYNE
-2.7
SAN JUAN
3.3
IRON
2.2
GARFIELD
4.5
WASHINGTON
6.2
KANE
6.2

Footnotes

County Business Statistics Tables

Totals may not add due to rounding.

[a] In 1985 the legal assessment rate was 20 percent of reasonable fair cash value. In 1986 it was 100 percent. To provide comparable data for 1986 the actual 1985 figure was multiplied by five.

[b] Based on Calendar Year.

[c] Based on Fiscal Year.

[d] Comparable data are not available due to under-reporting of construction activity in 1987.

na Not available.

[p] Preliminary.

[r] Revised.

Population:

Utah Population Work Committee, "1988 Population Estimates for Utah and Its Counties," Vol. 48, No. 11-12, *Utah Economic and Business Review*, Bureau of Economic and Business Research, (Salt Lake City, Dec. 1988), p. 4.

Labor Market:

Utah Department of Employment Security, *Statistical Abstract 1987*, pp. 43, 46, 118 and 119; 1988 data: Utah Department of Employment Security, preliminary data (Salt Lake City, April 1989).

Income Data:

Utah Department of Employment Security, *Statistical Abstract 1987*, pp. 48, 50; and 1985-86 data: Utah Department of Employment Security, *Annual Report*, Vol. III, Labor Market Information, 1985-86; and 1988 data: Utah Department of Employment Security, preliminary data (Salt Lake City, April 1989); and U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (Washington, D.C., May 1989).

Tax Data:

Utah State Tax Commission, *Annual Report of the Utah State Tax Commission*, 1984-85, 85-86, 86-87, 87-88 (Salt Lake City, years as indicated); Assessed Valuation: p. 24, Property Tax: p. 25, Net Local Sales Tax Allocations: pp. 49-51, and Utah State Tax Commission, *Calendar Year and Fourth Quarter of 1988 Gross Taxable Retail Sales and Purchases in the State of Utah*, (Salt Lake City, May 1989), pp. 46-75.

Note: In 1985, 1986, 1987 and 1988 the county totals of gross taxable retail sales are less than the total shown for the State of Utah. Out-of-State Use Tax Collections account for the differences between the figures.

Miscellaneous Data:

Utah State Tax Commission, *Utah New Car and Truck Sales, First, Second, Third and Fourth Quarters*, 1988 (Salt Lake City, April 1989); and Bureau of Land Management *News Release*, Salt Lake City, September 1988).

SELECTED BUSINESS STATISTICS FOR UTAH COUNTIES

	1985	1986	1987	1988	Percent Change 1987-88
BEAVER					
Population	5,050	4,950	4,900	4,800[p]	-2.0
Labor Market Data:					
Average civilian labor force	2,382[r]	2,159	2,111[p]	2,070[p]	-1.9
Average nonagricultural employment	1,440	1,259[r]	1,280	1,274[p]	-0.5
Income Data:					
Average monthly nonagricultural wage ($)	1,320	1,242[r]	1,176	1,238[p]	5.3
Annual nonagricultural payroll ($ thousands)	22,804	18,763[r]	18,066	18,932[p]	4.8
Total personal income ($ thousands)[r]	46,400	44,500	46,100	na	--
Per capita personal income ($)[r]	8,936	8,908	9,220	na	--
Tax Data:					
Total assessed valuation ($ thousands)	170,831[a]	192,815	193,454	197,000	1.8
Property taxes charged, by all taxing units ($ thousands)	1,895	2,268	2,224	2,271	2.1
Gross taxable sales ($ thousands)[b]	16,779	22,016	20,797[r]	24,817	19.3
Net local sales tax allocations ($ thousands)[c]	197	219	227	na	--
Construction (permit-authorized):					
New Dwelling units (number)	15	14	1	2	100.0
Value of new residential construction ($ thousands)	825	436	22	96	332.3
Value of new nonresidential construction ($ thousands)	936	44	942	229	-75.7
Value of total construction ($ thousands)	1,825	745	974	612	-37.2
Miscellaneous:					
New car and truck sales (number)	153	132	93	131	40.9
In lieu tax payments under Public Law 94-565 ($ thousands)	227	237	244	246	0.8
BOX ELDER					
Population	36,600	37,300	37,800	38,000[p]	0.5
Labor Market Data:					
Average civilian labor force	16,003[r]	16,505	17,426[p]	18,100[p]	3.9
Average nonagricultural employment	13,743	13,993[r]	15,051	15,898[p]	5.6
Income Data:					
Average monthly nonagricultural wage ($)	1,844	1,965[r]	2,080	2,084[p]	0.2
Annual nonagricultural payroll ($ thousands)	304,065	329,954[r]	375,584	397,488[p]	5.8
Total personal income ($ thousands)[r]	405,000	429,500	476,000	na	--
Per capita personal income ($)[r]	11,169	11,458	12,506	na	--
Tax Data:					
Total assessed valuation ($ thousands)	1,047,885[a]	1,118,846	1,136,772	1,123,000	-1.2
Property taxes charged, by all taxing units ($ thousands)	10,585	11,771	12,310	12,131	-1.5
Gross taxable sales ($ thousands)[b]	197,656	193,597	203,611[r]	202,248	-0.7
Net local sales tax allocations ($ thousands)[c]	1,884	1,971	2,017	na	--
Construction (permit-authorized):					
New Dwelling units (number)	116	121	163	113	-30.7
Value of new residential construction ($ thousands)	6,557	5,991	10,152	8,263	-18.6
Value of new nonresidential construction ($ thousands)	2,202	11,237	3,937	2,137	-45.7
Value of total construction ($ thousands)	11,044	20,178	16,058	13,626	-15.1
Miscellaneous:					
New car and truck sales (number)	1,533	1,577	1,191	1,148	-3.6
In lieu tax payments under Public Law 94-565 ($ thousands)	801	821	848	855	0.8
CACHE					
Population	66,700	67,800	69,200	70,600[p]	2.0
Labor Market Data:					
Average civilian labor force	26,966[r]	28,438	28,783[p]	29,550[p]	2.7
Average nonagricultural employment	22,069	22,989[r]	23,573	24,418[p]	3.6
Income Data:					
Average monthly nonagricultural wage ($)	1,130	1,183[r]	1,225	1,261[p]	2.9
Annual nonagricultural payroll ($ thousands)	299,294	326,236[r]	346,555	369,372[p]	6.6
Total personal income ($ thousands)[r]	580,000	627,600	667,900	na	--
Per capita personal income ($)[r]	8,973	9,606	10,181	na	--
Tax Data:					
Total assessed valuation ($ thousands)	1,115,876[a]	1,172,759	1,182,737	1,164,000	-1.6
Property taxes charged, by all taxing units ($ thousands)	14,068	15,241	16,819	16,295	-3.1
Gross taxable sales ($ thousands)[b]	334,645	336,407	337,450[r]	364,042	7.9
Net local sales tax allocations ($ thousands)[c]	3,270	3,362	3,413	na	--
Construction (permit-authorized):					
New Dwelling units (number)	264	294	205	182	-11.2
Value of new residential construction ($ thousands)	14,321	17,964	13,259	12,585	-5.1
Value of new nonresidential construction ($ thousands)	18,912	13,268	5,024	9,375	86.6
Value of total construction ($ thousands)	42,166	34,871	22,554	30,267	34.2
Miscellaneous:					
New car and truck sales (number)	1,998	2,119	1,668	1,568	-6.0
In lieu tax payments under Public Law 94-565 ($ thousands)	172	170	179	181	1.1

	1985	1986	1987	1988	Percent Change 1987-88
CARBON					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]					
[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Total personal income ($ thousands)[c]	258,100	263,100	268,700	na	
Per capita personal income ($)[c]	11,420	11,678	12,065	na	--
Tax Data:					
Total assessed valuation ($ thousands)	709,295[a]	761,044	742,211	745,000	0.4
Property taxes charged, by all taxing units ($ thousands)	10,247	11,003	10,721	10,736	0.1
Gross taxable sales ($ thousands)[b]	186,419	178,323	170,424[r]	173,073	1.6
Net local sales tax allocations ($ thousands)[c]	1,669	1,587	1,651	na	--
Construction (permit-authorized):					
New dwelling units (number)	21	22	31	20	-35.5
Value of new residential construction ($ thousands)	1,397	1,423	1,569	681	-56.6
Value of new nonresidential construction ($ thousands)	15,938	1,000	4,000	2,165	-45.9
Value of total construction ($ thousands)	18,974	3,273	6,093	4,120	-32.4
Miscellaneous:					
New car and truck sales (number)	867	860	618	682	10.4
In lieu tax payments under Public Law 94-565 ($ thousands)	328	324	336	339	0.9
DAGGETT					
Population	700	700	700	700[p]	0.0
Labor Market Data:					
Average civilian labor force	355[r]	395	449[p]	450[p]	0.2
Average nonagricultural employment	253	265[r]	310	312[p]	0.6
Income Data:					
Average monthly nonagricultural wage ($)	1,163	1,140[r]	1,086	1,132[p]	4.2
Annual nonagricultural payroll ($ thousands)	3,535	3,619[r]	4,032	4,239[p]	5.1
Total personal income ($ thousands)[c]	7,400	8,100	8,900	na	--
Per capita personal income ($)[c]	9,628	10,826	10,444	na	--
Tax Data:					
Total assessed valuation ($ thousands)	75,347[a]	91,135	97,417	107,000	9.8
Property taxes charged, by all taxing units ($ thousands)	733	846	891	971	9.0
Gross taxable sales ($ thousands)[b]	6,941	5,121	3,713[r]	5,294	42.6
Net local sales tax allocations ($ thousands)[c]	60	44	41	na	--
Construction (permit-authorized):					
New dwelling units (number)	0	0	0	0	--
Value of new residential construction ($ thousands)	0	0	0	0	--
Value of new nonresidential construction ($ thousands)	0	0	39	12	-69.0
Value of total construction ($ thousands)	0	0	61	59	-3.9
Miscellaneous:					
New car and truck sales (number)	30	30	32	36	12.5
In lieu tax payments under Public Law 94-565 ($ thousands)	35	35	36	36	0.0
DAVIS					
Population	170,000	175,000	179,000	184,000[p]	2.8
Labor Market Data:					
Average civilian labor force	72,385[r]	75,375	77,054[p]	75,860[p]	-1.5
Average nonagricultural employment	51,361	53,009[r]	52,187	52,498[p]	0.6
Income Data:					
Average monthly nonagricultural wage ($)	1,590	1,600[r]	1,590	1,651[p]	3.8
Annual nonagricultural payroll ($ thousands)	979,725	1,017,716[r]	995,878	1,040,260[p]	4.5
Total personal income ($ thousands)[c]	1,796,600	1,923,700	2,022,900	na	--
Per capita personal income ($)[c]	10,260	10,980	11,211	na	--
Tax Data:					
Total assessed valuation ($ thousands)	2,959,885[a]	3,132,112	3,199,004	3,237,000	1.2
Property taxes charged, by all taxing units ($ thousands)	46,193	51,968	52,255	52,909	1.3
Gross taxable sales ($ thousands)[b]	863,702	919,655	868,370[r]	912,829	5.1
Net local sales tax allocations ($ thousands)[c]	8,380	8,895	8,784	na	--
Construction (permit-authorized):					
New dwelling units (number)	1,879	2,293	1,089	819	-24.8
Value of new residential construction ($ thousands)	122,019	140,914	90,624	63,991	-29.4
Value of new nonresidential construction ($ thousands)	19,809	26,158	49,347	36,284	-26.5
Value of total construction ($ thousands)	152,109	176,144	150,806	110,444	-26.8
Miscellaneous:					
New car and truck sales (number)	8,868	8,277	6,473	6,534	0.9
In lieu tax payments under Public Law 94-565 ($ thousands)	22	21	21	23	9.5

	1985	1986	1987	1988	Percent Change 1987-88
DUCHESNE					
Population	14,700	14,300	13,700	13,100[p]	-4.4
Labor Market Data:					
Average civilian labor force	5,808[r]	5,790	5,508[p]	4,620[p]	-16.1
Average nonagricultural employment	4,338	4,003[r]	3,769	3,461[p]	-8.2
Income Data:					
Average monthly nonagricultural wage ($)	1,438	1,419[r]	1,452	1,348[p]	-7.2
Annual nonagricultural payroll ($ thousands)	74,886	68,153[r]	65,675	55,992	-14.7
Total personal income ($ thousands)[r]	143,100	139,300	140,800	na	--
Per capita personal income ($)[r]	9,367	9,184	9,805	na	--
Tax Data:					
Total assessed valuation ($ thousands)	1,210,841[a]	1,279,794	859,700	875,000	1.8
Property taxes charged, by all taxing units ($ thousands)	12,282	12,035	9,851	10,026	1.8
Gross taxable sales ($ thousands)[b]	133,440	99,945	77,504[r]	71,468	-7.8
Net local sales tax allocations ($ thousands)[r]	1,108	815	766	na	--
Construction (permit-authorized):					
New dwelling units (number)	67	74	43	18	-58.1
Value of new residential construction ($ thousands)	1,946	1,590	1,486	442	-70.2
Value of new nonresidential construction ($ thousands)	767	2,011	315	1,067	238.8
Value of total construction ($ thousands)	4,764	3,921	2,193	3,529	60.9
Miscellaneous:					
New car and truck sales (number)	822	860	343	347	1.2
In lieu tax payments under Public Law 94-565 ($ thousands)	394	427	442	444	0.5
EMERY					
Population	11,800	11,800	11,600	11,300[p]	-2.6
Labor Market Data:					
Average civilian labor force	4,093[r]	4,027	3,839[p]	3,550[p]	-7.5
Average nonagricultural employment	3,828	3,682[r]	3,509	3,440[p]	-2.0
Income Data:					
Average monthly nonagricultural wage ($)	2,089	2,158[r]	2,066	2,075[p]	0.4
Annual nonagricultural payroll ($ thousands)	95,975	95,362[r]	86,979	85,670[p]	-1.5
Total personal income ($ thousands)[r]	98,100	101,800	102,000	na	--
Per capita personal income ($)[r]	8,130	8,449	8,607	na	--
Tax Data:					
Total assessed valuation ($ thousands)	1,388,333[a]	1,484,720	1,547,634	1,537,000	-0.7
Property taxes charged, by all taxing units ($ thousands)	17,981	19,511	22,263	22,098	-0.7
Gross taxable sales ($ thousands)[b]	53,193	60,390	42,287[r]	50,216	18.8
Net local sales tax allocations ($ thousands)[r]	620	666	501	na	--
Construction (permit-authorized):					
New dwelling units (number)	3	3	7	3	-57.1
Value of new residential construction ($ thousands)	100	73	443	171	-61.5
Value of new nonresidential construction ($ thousands)	249	1,116	81	410	406.0
Value of total construction ($ thousands)	452	1,347	704	936	32.9
Miscellaneous:					
New car and truck sales (number)	398	364	254	278	9.4
In lieu tax payments under Public Law 94-565 ($ thousands)	399	395	408	411	0.7
GARFIELD					
Population	4,050	4,050	4,050	4,050[p]	0.0
Labor Market Data:					
Average civilian labor force	1,497[r]	1,586	1,534[p]	1,490[p]	-2.9
Average nonagricultural employment	1,331	1,381[r]	1,355	1,416[p]	4.5
Income Data:					
Average monthly nonagricultural wage ($)	1,036	1,095[r]	1,082	1,122[p]	3.7
Annual nonagricultural payroll ($ thousands)	16,552	18,147[r]	17,599	19,073[p]	8.4
Total personal income ($ thousands)[r]	36,600	40,200	41,500	na	--
Per capita personal income ($)[r]	9,107	9,685	9,882	na	--
Tax Data:					
Total assessed valuation ($ thousands)	205,248[a]	160,133	161,915	168,000	3.8
Property taxes charged, by all taxing units ($ thousands)	2,318	1,849	1,992	2,041	2.5
Gross taxable sales ($ thousands)[b]	22,433	24,076	27,387[r]	30,466	11.2
Net local sales tax allocations ($ thousands)[r]	217	231	257	na	--
Construction (permit-authorized):					
New dwelling units (number)	27	35	23	19	-17.4
Value of new residential construction ($ thousands)	1,184	1,306	926	996	7.6
Value of new nonresidential construction ($ thousands)	452	491	2,406	1,481	-38.5
Value of total construction ($ thousands)	2,001	2,104	3,521	2,732	-22.4
Miscellaneous:					
New car and truck sales (number)	147	139	108	117	8.3
In lieu tax payments under Public Law 94-565 ($ thousands)	191	202	208	210	1.0

	1985	1986	1987	1988	Percent Change 1987-88
GRAND					
Population	7,050	6,850	6,700	6,550[p]	-2.2
Labor Market Data:					
Average civilian labor force	3,126[r]	3,071	2,816[r]	2,740[p]	-2.7
Average nonagricultural employment	2,190	2,036[r]	2,029	2,046[p]	0.8
Income Data:					
Average monthly nonagricultural wage ($)	1,194	1,185[r]	1,167	1,218[p]	4.4
Annual nonagricultural payroll ($ thousands)	31,385	28,962[r]	28,400	29,903[p]	5.3
Total personal income ($ thousands)[d]	76,800	75,700	77,700	na	--
Per capita personal income ($)[d]	10,448	10,937	11,456	na	--
Tax Data:					
Total assessed valuation ($ thousands)	355,085[a]	340,782	262,252	268,000	2.2
Property taxes charged, by all taxing units ($ thousands)	4,098	4,267	3,590	3,667	2.1
Gross taxable sales ($ thousands)[b]	57,296	51,906	50,165[r]	60,537	20.7
Net local sales tax allocations ($ thousands)[c]	490	465	475	na	--
Construction (permit-authorized):					
New dwelling units (number)	7	6	4	9	125.0
Value of new residential construction ($ thousands)	223	232	133	249	86.9
Value of new nonresidential construction ($ thousands)	192	345	1,104	470	-57.5
Value of total construction ($ thousands)	817	910	1,843	1,234	-33.1
Miscellaneous:					
New car and truck sales (number)	172	107	151	181	19.9
In lieu tax payments under Public Law 94-565 ($ thousands)	317	314	324	327	0.9
IRON					
Population	19,400	19,500	19,500	19,200[p]	-1.5
Labor Market Data:					
Average civilian labor force	8,315[r]	8,235	8,393[p]	8,370[p]	-0.3
Average nonagricultural employment	6,297	6,160[r]	6,364	6,502[p]	2.2
Income Data:					
Average monthly nonagricultural wage ($)	1,087	1,106[r]	1,089	1,133[p]	4.0
Annual nonagricultural payroll ($ thousands)	82,112	81,779[r]	83,189	88,364[r]	6.2
Total personal income ($ thousands)[d]	154,000	160,600	168,900	na	--
Per capita personal income ($)[d]	7,792	8,190	8,650	na	--
Tax Data:					
Total assessed valuation ($ thousands)	566,256[a]	591,727	663,528	629,000	-5.2
Property taxes charged, by all taxing units ($ thousands)	8,091	8,542	9,083	8,603	-5.3
Gross taxable sales ($ thousands)[b]	165,525	136,759	139,310[r]	149,519	7.3
Net local sales tax allocations ($ thousands)[c]	1,288	1,269	1,303	na	--
Construction (permit-authorized):					
New dwelling units (number)	104	82	25	34	36.0
Value of new residential construction ($ thousands)	3,983	4,165	1,652	2,601	57.4
Value of new nonresidential construction ($ thousands)	10,958	4,057	8,042	6,743	-16.1
Value of total construction ($ thousands)	15,976	8,935	10,551	11,815	12.0
Miscellaneous:					
New car and truck sales (number)	625	588	521	497	-4.6
In lieu tax payments under Public Law 94-565 ($ thousands)	505	516	535	534	-0.2
JUAB					
Population	6,250	5,800	5,700[r]	5,700[p]	0.0
Labor Market Data:					
Average civilian labor force	1,995[r]	2,058	1,973[p]	2,000[p]	1.4
Average nonagricultural employment	1,483	1,471[r]	1,432	1,555[p]	8.6
Income Data:					
Average monthly nonagricultural wage ($)	973	903[r]	955	1,037[p]	8.6
Annual nonagricultural payroll ($ thousands)	17,328	15,942[r]	16,404	19,348[p]	17.9
Total personal income ($ thousands)[d]	46,300	47,300	48,600	na	--
Per capita personal income ($)[d]	7,619	7,741	8,162	na	--
Tax Data:					
Total assessed valuation ($ thousands)	220,667[a]	228,530	230,097	225,000	-2.2
Property taxes charged, by all taxing units ($ thousands)	2,862	2,938	2,903	2,837	-2.3
Gross taxable sales ($ thousands)[b]	37,198	33,151	33,796[r]	28,310	-16.2
Net local sales tax allocations ($ thousands)[c]	337	326	337	na	--
Construction (permit-authorized):					
New dwelling units (number)	27	5	3	13	333.3
Value of new residential construction ($ thousands)	882	324	225	498	121.1
Value of new nonresidential construction ($ thousands)	1,422	1,142	315	416	31.9
Value of total construction ($ thousands)	2,384	1,783	816	1,057	29.5
Miscellaneous:					
New car and truck sales (number)	190	187	181	155	-14.4
In lieu tax payments under Public Law 94-565 ($ thousands)	267	264	273	276	1.1

	1985	1986	1987	1988	Percent Change
KANE					
Population	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Labor Market Data:					
Average civilian labor force	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average nonagricultural employment	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Income Data:					
Average monthly nonagricultural wage ($)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Annual nonagricultural payroll ($ thousands)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total personal income ($ thousands)[f]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Per capita personal income ($)[f]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tax Data:					
Total assessed valuation ($ thousands)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Property taxes charged, by all taxing units ($ thousands)	[illegible]	1,868	1,955	[illegible]	[illegible]
Gross taxable sales ($ thousands)[b]	31,562	33,104	35,929[r]	[illegible]	[illegible]
Net local sales tax allocations ($ thousands)	[illegible]	301	332	na	
Construction (permit-authorized):					
New dwelling units (number)	57	60	59	57	-3.4
Value of new residential construction ($ thousands)	[illegible]	2,590	2,298	2,446	6.4
Value of new nonresidential construction ($ thousands)	631	494	1,518	1,449	-4.5
Value of total construction ($ thousands)	2,694	3,249	4,495	4,377	-2.6
Miscellaneous:					
New car and truck sales (number)	112	157	103	126	22.3
In lieu tax payments under Public Law 94-565 ($ thousands)	202	206	214	213	-0.5
MILLARD					
Population	14,200	13,600	13,000[r]	12,900[p]	-0.8
Labor Market Data:					
Average civilian labor force	8,806	7,361	5,823[r]	5,280[p]	-9.3
Average nonagricultural employment	5,621	4,459[r]	3,432	3,159[p]	-8.0
Income Data:					
Average monthly nonagricultural wage ($)	1,848	1,726[r]	1,579	1,651[p]	4.6
Annual nonagricultural payroll ($ thousands)	124,660	92,355[r]	65,020	62,598[p]	-3.7
Total personal income ($ thousands)[f]	153,500	137,100	122,600	na	--
Per capita personal income ($)[f]	10,661	9,787	9,521	na	--
Tax Data:					
Total assessed valuation ($ thousands)	1,481,082[a]	2,516,509	2,828,600	2,824,000	-0.2
Property taxes charged, by all taxing units ($ thousands)	8,929	13,585	16,263	16,205	-0.4
Gross taxable sales ($ thousands)[b]	183,534	159,461	38,241[r]	180,515	372.0
Net local sales tax allocations ($ thousands)[f]	1,515	798	796	na	--
Construction (permit-authorized):					
New dwelling units (number)	92	52	20	12	-40.0
Value of new residential construction ($ thousands)	4,901	3,330	1,220	714	-41.5
Value of new nonresidential construction ($ thousands)	997	1,159	2,131[r]	293	-86.3
Value of total construction ($ thousands)	6,096	5,029	3,841	1,691	-56.0
Miscellaneous:					
New car and truck sales (number)	470	430	276	321	16.3
In lieu tax payments under Public Law 94-565 ($ thousands)	332	392	404	407	0.7
MORGAN					
Population	5,450	5,500	5,650	5,700[p]	0.9
Labor Market Data:					
Average civilian labor force	1,690[r]	1,661	1,652[p]	1,630[p]	-1.3
Average nonagricultural employment	967	910[r]	885	877[p]	-0.9
Income Data:					
Average monthly nonagricultural wage ($)	1,386	1,449[r]	1,497	1,488[p]	-0.6
Annual nonagricultural payroll ($ thousands)	16,087	15,824[r]	15,882	15,662[p]	-1.4
Total personal income ($ thousands)[f]	57,900	62,400	66,200	na	--
Per capita personal income ($)[f]	11,323	11,800	12,097	na	--
Tax Data:					
Total assessed valuation ($ thousands)	136,019[a]	141,751	146,129	145,000	-0.8
Property taxes charged, by all taxing units ($ thousands)	1,885	2,005	2,030	2,019	-0.5
Gross taxable sales ($ thousands)[b]	23,856	21,388	19,607[r]	18,812	-4.1
Net local sales tax allocations ($ thousands)[f]	253	234	220	na	--
Construction (permit-authorized):					
New dwelling units (number)	20	30	26	20	-23.1
Value of new residential construction ($ thousands)	1,847	1,602	1,621	1,113	-31.3
Value of new nonresidential construction ($ thousands)	332	1,673	345	3,983	1054.5
Value of total construction ($ thousands)	2,470	3,491	2,226	5,894	164.8
Miscellaneous:					
New car and truck sales (number)	258	244	179	281	57.0
In lieu tax payments under Public Law 94-565 ($ thousands)	10	9	12	10	-16.7

PIUTE

	1985	1986	1987	1988	Percent Change 1987-1988
Population	1,550	1,550	1,550	1,550[e]	0.0
Labor Market Data:					
Average civilian labor force	383[r]	386	410[p]	400[p]	-2.4
Average nonagricultural employment	179	173[r]	196	190[r]	-3.1
Income Data:					
Average monthly nonagricultural wage ($)	962	948[r]	1,009	993[r]	-1.6
Annual nonagricultural payroll ($ thousands)	2,066	1,969[r]	2,360	2,264[r]	-4.1
Total personal income ($ thousands)[f]	10,000	11,000	12,100	na	
Per capita personal income ($)[f]	6,907	7,410	8,449	na	
Tax Data:					
Total assessed valuation ($ thousands)	30,105[a]	27,347	28,441	29,000	2.0
Property taxes charged, by all taxing units ($ thousands)	348	341	279	282	1.1
Gross taxable sales ($ thousands)[h]	2,594	2,614	2,637[r]	2,456	-6.9
Net local sales tax allocations ($ thousands)[f]	39	38	39	na	
Construction (permit-authorized):					
New dwelling units (number)	1	3	2	1	-50.0
Value of new residential construction ($ thousands)	70	143	115	55	-52.2
Value of new nonresidential construction ($ thousands)	11	0	18	40	122.2
Value of total construction ($ thousands)	81	143	133	95	-28.6
Miscellaneous:					
New car and truck sales (number)	35	28	23	22	-4.3
In lieu tax payments under Public Law 94-565 ($ thousands)	61	65	66	67	1.5

RICH

	1985	1986	1987	1988	Percent Change 1987-1988
Population	2,100	2,050	1,950	1,850[e]	-5.1
Labor Market Data:					
Average civilian labor force	821[r]	824	717[p]	840[p]	17.2
Average nonagricultural employment	366	336[r]	297	335[r]	12.8
Income Data:					
Average monthly nonagricultural wage ($)	950	940[r]	1,017	980[r]	-3.6
Annual nonagricultural payroll ($ thousands)	4,170	3,788[r]	3,615	3,941[r]	9.0
Total personal income ($ thousands)[f]	19,900	19,800	22,200	na	—
Per capita personal income ($)[f]	8,549	8,866	10,255	na	—
Tax Data:					
Total assessed valuation ($ thousands)	182,892[a]	162,686	156,772	158,000	0.8
Property taxes charged, by all taxing units ($ thousands)	1,879	1,703	1,592	1,608	1.0
Gross taxable sales ($ thousands)[h]	8,418	8,229	6,831[r]	6,026	-11.8
Net local sales tax allocations ($ thousands)[f]	83	85	78	na	—
Construction (permit-authorized):					
New dwelling units (number)	4	3	0	0	—
Value of new residential construction ($ thousands)	363	129	0	0	—
Value of new nonresidential construction ($ thousands)	173	26	0	0	—
Value of total construction ($ thousands)	536	168	0	0	—
Miscellaneous:					
New car and truck sales (number)	58	56	36	44	22.2
In lieu tax payments under Public Law 94-565 ($ thousands)	118	117	122	123	0.8

SALT LAKE

	1985	1986	1987	1988	Percent Change 1987-1988
Population	689,000	697,000	701,000[r]	705,000[e]	0.6
Labor Market Data:					
Average civilian labor force	337,621[r]	349,190	348,670[p]	347,730[p]	-0.3
Average nonagricultural employment	325,682	329,939[r]	333,039	339,967[r]	2.1
Income Data:					
Average monthly nonagricultural wage ($)	1,510	1,539[r]	1,598	1,655[r]	3.6
Annual nonagricultural payroll ($ thousands)	5,902,991	6,091,776[r]	6,388,527	6,750,731[r]	5.7
Total personal income ($ thousands)[f]	8,268,000	8,582,500	8,970,000	na	—
Per capita personal income ($)[f]	11,935	12,146	12,567	na	—
Tax Data:					
Total assessed valuation ($ thousands)	17,417,069[a]	17,786,728	18,686,759	18,636,000	-0.3
Property taxes charged, by all taxing units ($ thousands)	308,968	324,957	343,014	342,011	-0.3
Gross taxable sales ($ thousands)[h]	6,178,722	6,243,853	6,141,662[r]	6,493,023	5.7
Net local sales tax allocations ($ thousands)[f]	52,415	54,638	53,416	na	—
Construction (permit-authorized):					
New dwelling units (number)	6,961	6,834	2,803	2,139	-23.7
Value of new residential construction ($ thousands)	292,154	335,128	186,978	154,090	-17.6
Value of new nonresidential construction ($ thousands)	336,945	281,538	226,985	116,034	-48.9
Value of total construction ($ thousands)	702,738	719,341	499,379	356,933	-28.5
Miscellaneous:					
New car and truck sales (number)	37,520	35,922	26,398	27,931	5.8
In lieu tax payments under Public Law 94-565 ($ thousands)	61	59	62	63	1.6

	1985	1986	1987	1988	Percent Change 1987-88
SAN JUAN					
Population	12,500	12,700	12,900	12,900[p]	0.0
Labor Market Data:					
Average civilian labor force	3,563[r]	3,534	3,651[p]	3,750[p]	2.7
Average nonagricultural employment	2,872	2,843	2,954	3,052[p]	3.3
Income Data:					
Average monthly nonagricultural wage ($)	1,201	1,251[r]	1,276	1,346[p]	5.5
Annual nonagricultural payroll ($ thousands)	41,382	42,668[r]	45,210	49,287[p]	9.0
Total personal income ($ thousands)[r]	76,200	79,900	85,300	na	--
Per capita personal income ($)[r]	6,566	6,801	7,414	na	--
Tax Data:					
Total assessed valuation ($ thousands)	904,330[a]	930,453	684,752	676,000	-1.3
Property taxes charged, by all taxing units ($ thousands)	10,007	10,460	8,550	8,435	-1.3
Gross taxable sales ($ thousands)[h]	52,494	42,869	48,240[r]	44,523	-7.7
Net local sales tax allocations ($ thousands)[r]	558	495	564	na	--
Construction (permit-authorized):					
New dwelling units (number)	6	1	3	3	0.0
Value of new residential construction ($ thousands)	348	60	208	231	11.1
Value of new nonresidential construction ($ thousands)	190	353	118	171	44.9
Value of total construction ($ thousands)	688	577	488	546	11.9
Miscellaneous:					
New car and truck sales (number)	160	173	115	146	27.0
In lieu tax payments under Public Law 94-565 ($ thousands)	373	370	383	385	0.5
SANPETE					
Population	16,900	16,500	16,600	16,700[p]	0.6
Labor Market Data:					
Average civilian labor force	6,066[r]	6,073	6,206[p]	6,190[p]	-0.3
Average nonagricultural employment	3,580	3,471	3,698	3,840[p]	3.8
Income Data:					
Average monthly nonagricultural wage ($)	969	992[r]	994	999[p]	0.5
Annual nonagricultural payroll ($ thousands)	41,617	41,318[r]	44,110	46,014[p]	4.3
Total personal income ($ thousands)[r]	127,700	132,200	138,200	na	--
Per capita personal income ($)[r]	7,662	7,974	8,372	na	--
Tax Data:					
Total assessed valuation ($ thousands)	318,652[a]	335,667	311,316	311,000	-0.1
Property taxes charged, by all taxing units ($ thousands)	4,301	4,646	4,610	4,601	-0.2
Gross taxable sales ($ thousands)[h]	51,934	51,139	54,334[r]	53,767	-1.0
Net local sales tax allocations ($ thousands)[r]	605	609	645	na	--
Construction (permit-authorized):					
New dwelling units (number)	65	34	36	31	-13.9
Value of new residential construction ($ thousands)	1,961	1,484	2,041	1,485	-27.2
Value of new nonresidential construction ($ thousands)	4,780	1,877	1,051	2,472	135.2
Value of total construction ($ thousands)	15,881	3,761	3,716	4,424	19.1
Miscellaneous:					
New car and truck sales (number)	418	474	336	357	6.3
In lieu tax payments under Public Law 94-565 ($ thousands)	372	369	381	384	0.8
SEVIER					
Population	16,200	15,800	15,900[r]	15,900[p]	0.0
Labor Market Data:					
Average civilian labor force	6,409[r]	6,407	6,542[p]	6,410[p]	-2.0
Average nonagricultural employment	4,862	4,736[r]	4,914	4,943[p]	0.6
Income Data:					
Average monthly nonagricultural wage ($)	1,224	1,282[r]	1,309	1,315[p]	0.5
Annual nonagricultural payroll ($ thousands)	71,395	72,863[r]	77,202	78,022[p]	1.1
Total personal income ($ thousands)[r]	143,300	148,700	158,300	na	--
Per capita personal income ($)[r]	9,122	9,465	10,157	na	--
Tax Data:					
Total assessed valuation ($ thousands)	433,621[a]	430,070	419,984	419,000	-0.2
Property taxes charged, by all taxing units ($ thousands)	5,132	5,454	5,218	5,207	-0.2
Gross taxable sales ($ thousands)[h]	111,014	102,366	101,732[r]	101,743	0.0
Net local sales tax allocations ($ thousands)[r]	1,009	968	982	na	--
Construction (permit-authorized):					
New dwelling units (number)	7	31	18	15	-16.7
Value of new residential construction ($ thousands)	385	1,935	1,399	881	-37.0
Value of new nonresidential construction ($ thousands)	129	3,087	748	435	-41.9
Value of total construction ($ thousands)	598	5,271	2,910	1,661	-42.9
Miscellaneous:					
New car and truck sales (number)	474	485	355	456	28.5
In lieu tax payments under Public Law 94-565 ($ thousands)	419	436	447	452	1.1

	1985	1986	1987	1988	Percent Change 1987-88
SUMMIT					
Population	12,400	12,700	13,300[r]	13,400[p]	0.8
Labor Market Data:					
Average civilian labor force	6,751[r]	7,209	7,631[p]	7,820[p]	2.5
Average nonagricultural employment	5,822	6,093[r]	6,578	6,925[p]	5.3
Income Data:					
Average monthly nonagricultural wage ($)	1,088	1,030[r]	1,064	1,173[p]	10.2
Annual nonagricultural payroll ($ thousands)	76,000	75,346[r]	83,946	97,499[p]	16.1
Total personal income ($ thousands)[r]	187,100	201,600	212,900	na	--
Per capita personal income ($)[r]	15,037	15,468	15,906	na	--
Tax Data:					
Total assessed valuation ($ thousands)	3,318,516[a]	3,276,597	2,407,626	2,386,000	-0.9
Property taxes charged, by all taxing units ($ thousands)	32,422	33,371	27,945	27,379	-2.0
Gross taxable sales ($ thousands)[b]	172,067	172,968	185,063[r]	200,885	8.5
Net local sales tax allocations ($ thousands)[c]	1,651	1,413	1,541	na	--
Construction (permit-authorized):					
New dwelling units (number)	99	170	206	239	16.0
Value of new residential construction ($ thousands)	9,139	10,343	18,531	24,111	30.1
Value of new nonresidential construction ($ thousands)	22,694	11,387	3,056	6,418	110.0
Value of total construction ($ thousands)	34,253	23,983	26,390	33,801	28.1
Miscellaneous:					
New car and truck sales (number)	955	887	750	763	1.7
In lieu tax payments under Public Law 94-565 ($ thousands)	323	327	334	340	1.8
TOOELE					
Population	28,300	28,100	28,100	27,800[p]	-1.1
Labor Market Data:					
Average civilian labor force	11,697[r]	11,907	11,254[p]	11,080[p]	-1.5
Average nonagricultural employment	10,468	10,327[r]	9,993	10,109[p]	1.2
Income Data:					
Average monthly nonagricultural wage ($)	1,772	1,828[r]	1,890	1,870[p]	-1.1
Annual nonagricultural payroll ($ thousands)	222,606	226,490[r]	226,590	226,902[p]	0.1
Total personal income ($ thousands)[r]	320,600	323,900	335,500	na	--
Per capita personal income ($)[r]	10,966	11,164	11,580	na	--
Tax Data:					
Total assessed valuation ($ thousands)	597,271[a]	629,328	633,234	635,000	0.3
Property taxes charged, by all taxing units ($ thousands)	8,400	8,891	9,252	9,228	-0.3
Gross taxable sales ($ thousands)[b]	116,177	113,363	112,646[r]	120,262	6.8
Net local sales tax allocations ($ thousands)[c]	1,213	1,226	1,259	na	--
Construction (permit-authorized):					
New dwelling units (number)	126	80	77	66	-14.3
Value of new residential construction ($ thousands)	6,201	4,388	5,522	4,261	-22.8
Value of new nonresidential construction ($ thousands)	1,456	3,470	3,368	4,057	20.5
Value of total construction ($ thousands)	9,274	8,722	10,162	8,890	-12.5
Miscellaneous:					
New car and truck sales (number)	1,096	1,200	934	1,003	7.4
In lieu tax payments under Public Law 94-565 ($ thousands)	679	688	710	717	1.0
UINTAH					
Population	24,000	23,000	21,800[r]	21,500[p]	-1.4
Labor Market Data:					
Average civilian labor force	9,804[r]	9,035	8,544[p]	8,230[p]	-3.7
Average nonagricultural employment	7,776	6,694[r]	6,406	6,497[p]	1.4
Income Data:					
Average monthly nonagricultural wage ($)	1,551	1,508[r]	1,505	1,490[p]	-1.0
Annual nonagricultural payroll ($ thousands)	144,700	121,157[r]	115,651	116,169[p]	0.4
Total personal income ($ thousands)[r]	229,200	214,700	215,200	na	--
Per capita personal income ($)[r]	9,140	8,918	9,395	na	--
Tax Data:					
Total assessed valuation ($ thousands)	2,031,146[a]	1,858,688	1,548,924	1,583,000	2.2
Property taxes charged, by all taxing units ($ thousands)	21,033	20,408	18,283	18,706	2.3
Gross taxable sales ($ thousands)[b]	247,949	161,599	145,959[r]	155,750	6.7
Net local sales tax allocations ($ thousands)[c]	2,011	1,346	1,383	na	--
Construction (permit-authorized):					
New dwelling units (number)	23	13	7	7	0.0
Value of new residential construction ($ thousands)	1,965	884	341	450	32.0
Value of new nonresidential construction ($ thousands)	7,265	2,161	459	1,720	274.6
Value of total construction ($ thousands)	12,594	3,245	1,669	2,685	60.9
Miscellaneous:					
New car and truck sales (number)	1,018	698	498	576	15.7
In lieu tax payments under Public Law 94-565 ($ thousands)	622	674	697	703	0.9

UTAH

	1985	1986	1987	1988	Percent Change 1987-88
Population	250,000	253,000	258,000	262,000[p]	1.6
Labor Market Data:					
Average civilian labor force	93,431[r]	97,584	98,841[p]	104,940[p]	6.2
Average nonagricultural employment	70,143	72,478[r]	74,478	80,121[p]	7.6
Income Data:					
Average monthly nonagricultural wage ($)	1,213	1,233[r]	1,247	1,339[p]	7.4
Annual nonagricultural payroll ($ thousands)	1,021,287	1,072,229[r]	1,114,541	1,287,529[p]	15.5
Total personal income ($ thousands)[r]	1,959,400	2,059,000	2,145,000	na	--
Per capita personal income ($)[r]	8,161	8,588	8,870	na	--
Tax Data:					
Total assessed valuation ($ thousands)	4,212,405[a]	4,389,144	4,406,284	4,375,000	-0.7
Property taxes charged, by all taxing units ($ thousands)	58,501	61,003	63,788	63,331	-0.7
Gross taxable sales ($ thousands)[b]	1,253,488	1,233,664	1,255,924[r]	1,366,209	8.8
Net local sales tax allocations ($ thousands)[c]	12,284	12,379	12,978	na	--
Construction (permit-authorized):					
New dwelling units (number)	1,022	1,200	1,095	799	-27.0
Value of new residential construction ($ thousands)	57,978	64,101	70,670	61,196	-13.4
Value of new nonresidential construction ($ thousands)	53,800	24,674	61,939	45,490	-26.6
Value of total construction ($ thousands)	132,518	104,505	150,902	127,474	-15.5
Miscellaneous:					
New car and truck sales (number)	7,171	7,117	5,619	6,087	8.3
In lieu tax payments under Public Law 94-565 ($ thousands)	482	480	498	504	1.2

WASATCH

	1985	1986	1987	1988	Percent Change 1987-88
Population	9,200	9,450	9,700	9,800[p]	1.0
Labor Market Data:					
Average civilian labor force	3,900[r]	4,080	4,478[p]	4,590[p]	2.5
Average nonagricultural employment	1,902	1,928[r]	2,160	2,367[r]	9.6
Income Data:					
Average monthly nonagricultural wage ($)	1,001	983[r]	1,032	1,249[p]	21.0
Annual nonagricultural payroll ($ thousands)	22,836	22,749[r]	26,727	35,480[p]	32.7
Total personal income ($ thousands)[r]	93,100	96,200	100,300	na	--
Per capita personal income ($)[r]	9,603	10,010	10,283	na	--
Tax Data:					
Total assessed valuation ($ thousands)	287,134[a]	293,536	296,732	296,000	-0.2
Property taxes charged, by all taxing units ($ thousands)	3,817	3,813	3,789	3,784	-0.1
Gross taxable sales ($ thousands)[b]	44,246	41,550	41,178[r]	45,340	10.1
Net local sales tax allocations ($ thousands)[c]	436	440	434	na	--
Construction (permit-authorized):					
New dwelling units (number)	33	42	2	40	--[d]
Value of new residential construction ($ thousands)	1,986	1,617	88	2,112	--[d]
Value of new nonresidential construction ($ thousands)	1,171	349	0	209	--[d]
Value of total construction ($ thousands)	3,459	2,064	108	2,513	--[d]
Miscellaneous:					
New car and truck sales (number)	409	350	289	253	-12.5
In lieu tax payments under Public Law 94-565 ($ thousands)	308	308	320	327	2.2

WASHINGTON

	1985	1986	1987	1988	Percent Change 1987-88
Population	35,700	39,100	41,300[r]	43,000[p]	4.1
Labor Market Data:					
Average civilian labor force	13,510[r]	15,356	15,635[p]	16,470[p]	5.3
Average nonagricultural employment	9,361	10,452[r]	10,896	11,574[p]	6.2
Income Data:					
Average monthly nonagricultural wage ($)	1,080	1,101[r]	1,133	1,175[p]	3.7
Annual nonagricultural payroll ($ thousands)	121,276	138,099[r]	148,099	163,220[p]	10.2
Total personal income ($ thousands)[r]	313,000	357,400	381,800	na	--
Per capita personal income ($)[r]	8,886	9,200	9,177	na	--
Tax Data:					
Total assessed valuation ($ thousands)	902,314[a]	962,543	1,071,313	1,065,000	-0.6
Property taxes charged, by all taxing units ($ thousands)	12,068	14,426	15,571	15,477	-0.6
Gross taxable sales ($ thousands)[b]	266,555	300,168	290,477[r]	316,165	8.8
Net local sales tax allocations ($ thousands)[c]	2,317	2,557	2,514	na	--
Construction (permit-authorized):					
New dwelling units (number)	3,128	896	533	493	-7.5
Value of new residential construction ($ thousands)	118,483	45,019	32,367	31,823	-1.7
Value of new nonresidential construction ($ thousands)	42,015	19,827	14,771	13,323	-9.8
Value of total construction ($ thousands)	164,758	69,429	50,793	48,827	-3.9
Miscellaneous:					
New car and truck sales (number)	1,390	1,482	1,094	1,085	-0.8
In lieu tax payments under Public Law 94-565 ($ thousands)	690	749	777	774	-0.4

	1985	1986	1987	1988	Percent Change 1987-88
WAYNE					
Population	2,100	2,100	2,050	2,100[p]	2.4
Labor Market Data:					
Average civilian labor force	898[r]	947	1,042[p]	1,100[p]	5.6
Average nonagricultural employment	419	438[r]	514	500[p]	-2.7
Income Data:					
Average monthly nonagricultural wage ($)	1,243	1,145[r]	1,252	1,141[p]	-8.9
Annual nonagricultural payroll ($ thousands)	6,251	6,024[r]	7,724	6,848[p]	-11.3
Total personal income ($ thousands)[y]	17,300	18,400	21,400	na	--
Per capita personal income ($)[y]	8,083	8,843	9,886	na	--
Tax Data:					
Total assessed valuation ($ thousands)	45,595[a]	50,831	49,472	52,000	5.1
Property taxes charged, by all taxing units ($ thousands)	486	526	568	584	2.8
Gross taxable sales ($ thousands)[b]	6,715	7,110	7,859[r]	8,793	11.9
Net local sales tax allocations ($ thousands)[c]	74	74	89	na	--
Construction (permit-authorized):					
New dwelling units (number)	1	4	2	3	50.0
Value of new residential construction ($ thousands)	75	231	33	10	-69.7
Value of new nonresidential construction ($ thousands)	1,051	198	0	17	--
Value of total construction ($ thousands)	1,129	448	86	297	245.3
Miscellaneous:					
New car and truck sales (number)	97	58	56	65	16.1
In lieu tax payments under Public Law 94-565 ($ thousands)	100	101	104	105	1.0
WEBER					
Population	155,000	157,000	157,000	158,000[p]	0.6
Labor Market Data:					
Average civilian labor force	70,814[r]	73,600	73,901[p]	73,010[p]	-1.2
Average nonagricultural employment	57,359	59,850[r]	60,310	61,965[p]	2.7
Income Data:					
Average monthly nonagricultural wage ($)	1,297	1,318[r]	1,349	1,399[p]	3.7
Annual nonagricultural payroll ($ thousands)	892,985	946,613[r]	976,537	1,040,382[p]	6.5
Total personal income ($ thousands)[y]	1,844,100	1,931,300	2,023,200	na	--
Per capita personal income ($)[y]	11,713	12,137	12,622	na	--
Tax Data:					
Total assessed valuation ($ thousands)	3,032,341[a]	3,145,967	3,382,843	3,392,000	0.3
Property taxes charged, by all taxing units ($ thousands)	48,863	52,263	56,752	56,886	0.2
Gross taxable sales ($ thousands)[b]	1,114,170	1,145,342	1,144,237[r]	1,175,411	2.7
Net local sales tax allocations ($ thousands)[c]	9,954	10,528	10,593	na	--
Construction (permit-authorized):					
New dwelling units (number)	1,072	1,042	822	551	-33.0
Value of new residential construction ($ thousands)	52,957	68,073	51,284	37,096	-27.7
Value of new nonresidential construction ($ thousands)	22,220	26,779	21,383	15,067	-29.5
Value of total construction ($ thousands)	99,259	111,892	101,625	65,425	-35.6
Miscellaneous:					
New car and truck sales (number)	7,443	7,768	5,391	5,148	-4.5
In lieu tax payments under Public Law 94-565 ($ thousands)	41	40	512	44	-91.4
STATE TOTALS					
Population	1,645,000	1,665,000	1,680,000[r]	1,695,000[p]	0.9
Labor Market Data:					
Average civilian labor force	730,000	754,000	756,000[p]	759,030[p]	0.4
Average nonagricultural employment	624,387	634,138[r]	640,298	657,986[p]	2.8
Income Data:					
Average monthly nonagricultural wage ($)	1,440	1,463[r]	1,501	1,554[p]	3.5
Annual nonagricultural payroll ($ thousands)	10,792,244	11,131,359[r]	11,535,485	12,269,608[p]	6.4
Total personal income ($ thousands)[y]	17,512,500	18,284,500	19,129,250	20,315,250	6.2
Per capita personal income ($)[y]	10,645	10,986	11,386	11,985	5.3
Tax Data:					
Total assessed valuation ($ thousands)	45,510,457[a]	47,645,503	47,506,209	47,413,000	-0.2
Property taxes charged, by all taxing units ($ thousands)	660,327	701,957	724,363	722,324	-0.3
Gross taxable sales ($ thousands)[b]	12,573,850	12,378,377	12,188,437[r]	13,016,523	6.8
Net local sales tax allocations ($ thousands)[c]	106,324	107,528	107,338	na	--
Construction (permit-authorized):					
New dwelling units (number)	15,247	13,444	7,305	5,715	-21.8
Value of new residential construction ($ thousands)	706,195	715,472	495,208	412,998	-16.6
Value of new nonresidential construction ($ thousands)	567,695	439,921	413,440	272,055	-34.2
Value of total construction ($ thousands)	1,441,536	1,319,527	1,075,096	846,550	-21.3
Miscellaneous:					
New car and truck sales (number)	78,196	75,901	54,085	60,664	12.2
In lieu tax payments under Public Law 94-565 ($ thousands)	8,852	9,115	9,897	9,498	-4.0

Utah Business Statistics

UTAH DATA	Dec. [illegible]	Dec. [illegible]	% Chg. From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted; mil. of dol.) (qtrly)	19,646	21,116	7.5%	20,315	19,028	6.8%
New Corporations (no.)	402	501	24.6%	462	453	1.9%
New Car, Truck and Motor Home Sales (no.)	4,459	4,572	2.5%	5,222	4,854	7.6%
Agriculture						
Average Prices Received by Farmers (dol.)						
Beef Steers and Heifers (cwt.) (thous.)	63.80	69.40	8.8%	68.03	63.53	7.1%
Lambs (cwt.)	60.10	63.30	8.4%	63.81	72.33	11.8%
Milk, Wholesale (cwt.)	12.30	13.00	5.7%	11.65	11.94	2.4%
Alfalfa Hay, Baled (per ton)	70.00	77.00	10.0%	75.58	67.33	12.3%
Cattle Slaughtered (live weight) (thous. of lbs.)	36,826	38,234	3.6%	46,597	41,816	11.4%
Construction						
Total Construction (thous. of dol.) 1	63,036	75,520	19.8%	121,710	116,425	4.5%
Residential	26,333	35,436	34.5%	48,060	48,368	0.6%
Nonresidential	29,988	32,964	9.9%	41,971	39,370	6.6%
Public Works and Utilities	6,705	7,120	6.2%	31,685	28,687	10.4%
Total Permit Construction (thous. of dol.) 2	53,624.9	54,173.9	1.0%	70,545.8	89,591.3	21.3%
Residential	21,606.8	21,474.8	0.6%	34,416.5	41,267.3	16.6%
Nonresidential	23,939.7	20,894.9	12.7%	22,671.3	34,453.4	34.2%
Additions, Alterations and Repairs	8,078.4	11,804.2	46.1%	13,458.0	13,870.7	3.0%
New Dwelling Units (no.)	287	285	0.7%	475	609	22.0%
Employment						
Civilian Labor Force (thous.)	759.6	779.9	2.7%	758.9	756.1	0.4%
Total Employed Persons	723.5	752.1	4.0%	721.3	708.8	1.8%
Unemployed Persons	36.1	27.9	22.7%	37.6	47.3	20.5%
Percent Total Labor Force	4.8	3.6	25.0%	5.0	6.3	20.9%
Employees on Nonagricultural Payrolls (thous. of pers.)	656.2	682.7	4.3%	656.3	640.3	2.5%
Manufacturing	96.3	102.1	6.0%	97.2	92.5	5.1%
Mining	8.4	8.0	4.8%	8.3	8.0	3.2%
Contract Construction	25.3	25.6	1.2%	24.4	26.7	8.7%
Transportation, Communication and Utilities	39.1	41.4	5.9%	39.3	37.9	3.7%
Wholesale Trade	34.7	36.4	4.9%	34.7	34.9	0.4%
Retail Trade	123.7	128.8	4.1%	119.7	118.0	1.4%
Finance, Insurance and Real Estate	33.6	33.0	1.8%	33.5	33.7	0.7%
Services 3	152.4	162.7	6.8%	157.1	147.0	6.9%
Federal Government	39.4	39.1	0.8%	39.5	39.9	1.0%
State Government 4	38.1	38.9	2.1%	38.0	37.9	0.2%
Local Government 4	65.4	66.7	2.0%	64.8	63.9	1.4%
Average Weekly Hours						
Manufacturing	40.7	41.0	0.7%	40.6	39.6	2.4%
Mining	45.3	40.0	11.8%	42.3	41.3	2.4%
Wholesale Trade	38.8	36.8	5.2%	37.5	38.0	1.3%
Retail Trade	26.9	27.6	2.6%	28.1	28.1	0.0%
Amount of Unemployment Compensation (thous. of dol.)	6,977.1	5,108.2	26.8%	5,793.4	7,778.1	25.5%
Finance						
Savings, Savings and Loan Associations (mil. of dol.)	2,463.8	2,343.8	4.9%	2,535.1	2,453.4	4.8%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	83,222.1	90,757.0	7.8%	147,053.3	140,423.2	4.7%
Sales and Use Tax	1,213.6	3,441.7	183.6%	53,328.3	47,601.5	12.0%
Motor Fuel Tax	13,230.3	11,413.1	13.7%	10,875.5	9,454.6	15.0%
Individual Income Tax	44,087.5	48,256.4	9.5%	52,883.8	49,386.4	7.1%
Corporation Franchise Tax	5,912.7	15,149.3	156.2%	6,655.0	6,843.8	2.8%
Production						
Net Electric Power Utilized (mil. of kwh)	1,192.5	1,337.9	12.2%	1,259.9	1,151.1	9.5%
Crude Oil to Refineries (thous. of bbls.)	4,049.1	4,637.1	14.5%	4,268.0	3,798.3	12.4%
Crude Oil (thous. of bbls.)	2,885.1	2,554.8	11.4%	2,756.3	2,951.0	6.6%
Natural Gas (mil. of cu. ft.)	24,247.7	24,932.4	2.8%	23,124.0	21,627.3	6.9%
Coal (thous. short tons)	1,542.0	1,453.0	5.8%	1,507.0	1,260.9	19.5%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	854,583	882,695	3.3%	867,322	846,990	2.4%
Highway Traffic Count Across State Lines	30,507	33,030	8.3%	NA	37,947	NA
Transient Room Taxes (thous. of dol.)	(1,137.7)	(226.4)	80.1%	624.9	387.7	61.2%
Visits, State, Nat'l. Parks, Monuments (thous.)	269.3	261.7	2.8%	1,103.6	1,060.9	4.0%
Utilities						
Telephone Lines in Service (Mt. Bell) (Residential)	485,524	494,417	1.8%	488,597	479,894	1.8%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	178,329	183,697	3.0%	181,030	175,852	2.9%
Electric Customers (Residential)	477,056	481,839	1.0%	476,717	473,099	0.8%
Electric Customers (Commercial)	46,566	47,267	1.5%	46,827	46,276	1.2%
Natural Gas Customers (Residential & Commercial)	454,990	466,151	2.5%	459,251	446,737	2.8%
Natural Gas Customers (Industrial)	548	558	1.8%	549	554	-0.8%

Utah Business Statistics

UTAH DATA	Dec 1987	Dec 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.3r	53.6fo	2.5%	52.5	52.2	0.6%
Unemployment Rate	5.0r	3.0	-40.0%	4.3	5.4	-20.4%
Auth. Permit Construction (thous. of dol.)	5,477.3	4,719.1	-13.8%	9,203.6	12,567.2	-26.8%
New Dwelling Units (no.)	46	48	4.3%	68	91	-24.8%
Postal Receipts (thous. of dol.)	553.0	590.9	6.9%	424.9	390.9	8.7%
Electric Customers (Residential)	47,990	48,382	0.8%	48,095	47,318	1.6%
Electric Customers (Commercial)	3,334	3,538	6.1%	3,462	3,287	5.3%
Natural Gas Customers (Residential)	49,610	51,132	3.1%	50,399	48,840	3.2%
Natural Gas Customers (Industrial)	52	54	3.8%	53	52	1.6%
Telephone Lines in Service (Mt. Bell)(Residential)	54,642	55,950	2.4%	55,347	54,795	1.0%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,796	11,620	7.6%	11,333	10,559	7.3%
Salt Lake County						
Non-Ag. Employment (thous.)	340.7r	350.9fo	3.0%	339.8	333.0	2.0%
Unemployment Rate	5.5r	3.2	-41.8%	4.6	5.6	-17.8%
Auth. Permit Construction (thous. of dol.)	25,322.3	19,916.5	-21.3%	29,744.3	41,614.9	-28.5%
New Dwelling Units (no.)	108	98	-9.3%	178	234	-23.7%
Postal Receipts (thous. of dol.)	8,009.4	8,825.8	10.2%	7,973.3	7,320.5	8.9%
Electric Customers (Residential)	239,111	242,571	1.4%	239,738	236,466	1.4%
Electric Customers (Commercial)	20,324	20,605	1.4%	20,399	19,957	2.2%
Natural Gas Customers (Residential)	219,727	223,080	1.5%	220,869	217,253	1.7%
Natural Gas Customers (Industrial)	234	238	1.7%	237	240	-1.3%
Telephone Lines in Service (Mt. Bell)(Residential)	229,088	232,565	1.5%	230,288	226,860	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,406	111,791	1.3%	111,015	109,796	1.1%
Utah County						
Non-Ag. Employment (thous.)	79.4r	84.0fo	5.8%	77.1	74.5	3.6%
Unemployment Rate	5.4r	4.0	-25.9%	4.4	6.9	-36.5%
Auth. Permit Construction (thous. of dol.)	8,706.1	12,154.4	39.6%	10,622.8	12,575.1	-15.5%
New Dwelling Units (no.)	25	47	88.0%	67	91	-27.0%
Postal Receipts (thous. of dol.)	1,271.9	1,629.1	28.1%	1,194.5	935.1	27.7%
Electric Customers (Residential)	51,648	52,600	1.9%	52,305	52,050	0.5%
Electric Customers (Commercial)	5,921	5,947	0.4%	5,978	6,278	-4.8%
Natural Gas Customers (Residential)	61,326	62,564	2.0%	61,755	60,271	2.5%
Natural Gas Customers (Industrial)	69	71	2.9%	68	68	0.1%
Telephone Lines in Service (Mt. Bell)(Residential)	64,380	65,985	2.5%	64,681	62,362	3.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,570	21,018	7.4%	20,161	18,800	7.2%
Weber County						
Non-Ag. Employment (thous.)	60.4r	62.9fo	4.1%	61.4	60.3	1.8%
Unemployment Rate	7.0r	4.2	-40.0%	5.7	7.1	-20.4%
Auth. Permit Construction (thous. of dol.)	5,710.4	3,377.9	-40.8%	5,452.1	8,468.7	-35.6%
New Dwelling Units (no.)	46	28	-39.1%	46	69	-33.0%
Postal Receipts (thous. of dol.)	851.1	880.0	3.4%	671.4	611.7	9.8%
Electric Customers (Residential)	53,426	53,914	0.9%	53,522	52,831	1.3%
Electric Customers (Commercial)	4,928	4,870	1.2%	4,919	4,852	1.4%
Natural Gas Customers (Residential)	49,528	50,377	1.7%	49,814	49,008	1.6%
Natural Gas Customers (Industrial)	85	86	1.2%	84	85	-1.9%
Telephone Lines in Service (Mt. Bell)(Residential)	46,093	46,877	1.7%	46,497	45,964	1.2%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,355	12,139	6.9%	11,876	11,034	7.6%

NA Not Available   r Revised   fo Forecast

Sources:

Personal Income:	Bureau of Economic Analysis, U.S. Department of Commerce.
New Corporations:	Utah Secretary of State.
New Car and Truck Sales:	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture:	U.S. Department of Agriculture, Agriculture, Utah: Utah Crop and Livestock Reporting Service.
Construction Data:	F.W. Dodge Statistics and Utah Construction Report, Bureau of Economic and Business Research.
Employment Data:	Utah Department of Employment Security.
Savings Information:	Utah Savings and Loan Institutions.
Tax Collections:	Utah State Tax Commission.
Net Electric Power Utilized:	Cooperating Utah Power Companies.
Crude Oil Production:	Area Oil Refineries.
Natural Gas Production:	Utah Department of Oil, Gas, and Mining.
Coal Production:	U.S. Department of Energy.
Air Passengers:	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count:	Utah Department of Transportation.
Visits to State and National Parks and Monuments:	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data:	Cooperating Utah Utility Companies.
Postal Receipts:	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Footnotes:
1 Obtained from F.W. Dodge Statistics.
2 Obtained from Utah Construction Report.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

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NATIONAL DATA	Dec. 1987	Dec. 1988	% Change From Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,662.8	4,999.7	7.2%	4,864.3	4,526.7	7.5%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,939.0	4,200.8	6.6%	4,062.1	3,780.0	7.5%
Industrial Production Indexes (seasonally adjusted) (1977=100)	133.9	140.4	4.9%	137.2	129.8	5.7%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	406.8	443.7	9.1%	429.7	387.9	10.8%
Index of Leading Indicators (1982=100)	138.8	144.8	4.3%	142.5	139.6	2.1%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	115.4	120.5	4.4%	118.3	113.6	4.1%
CPI-U (All Urban Consumers) Food & Beverages	114.8	120.6	5.1%	118.2	113.5	4.1%
CPI-U (All Urban Consumers) Housing	115.6	120.2	4.0%	118.4	114.2	3.7%
CPI-U (All Urban Consumers) Transportation	107.6	110.8	3.0%	108.7	105.4	3.2%
CPI-U (All Urban Consumers) Medical Care	133.1	142.3	6.9%	138.6	130.2	6.5%
CPI-U (All Urban Consumers) Energy	88.3	88.7	0.5%	89.3	88.6	0.8%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	105.8	110.0	4.0%	108.0	105.4	2.5%
GNP Price Deflator (1982=100) (qtly.)	118.9	124.0	4.3%	121.7	117.7	3.4%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	120.7	122.6	1.6%	121.7	119.8	1.5%
Total Civilian Employment (mil.)	113.7	116.0	2.0%	115.0	112.4	2.3%
Unemployment Rate	5.8	5.3	-8.6%	5.5	6.2	-11.2%
Construction						
Total Construction (mil. of dol.)	19,223.6	18,026.7	-6.2%	20,341.5	21,390.4	-4.9%
Residential	8,716.4	8,897.3	2.1%	9,838.6	10,037.8	-2.0%
Nonresidential	7,159.5	5,887.8	-17.8%	6,871.3	7,533.4	-8.8%
Non-Building	3,347.7	3,241.6	3.2%	3,631.5	3,841.8	-5.5%
New Dwelling Units (no.)	97,978	104,334	6.5%	118,546	132,160	-10.3%
Interest Rates						
Short Term (3-month Treasury bill rate)	5.80	8.09	39.5%	6.67	5.83	14.5%
Long Term (30-year Treasury bond yields)	9.12	9.13	0.1%	8.98	8.63	4.0%
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	8.75	10.50	20.0%	9.32	8.20	13.6%
Mortgage Rates (new homes)	8.78	9.04	3.0%	8.81	8.94	-1.4%

Sources: Business Conditions Digest, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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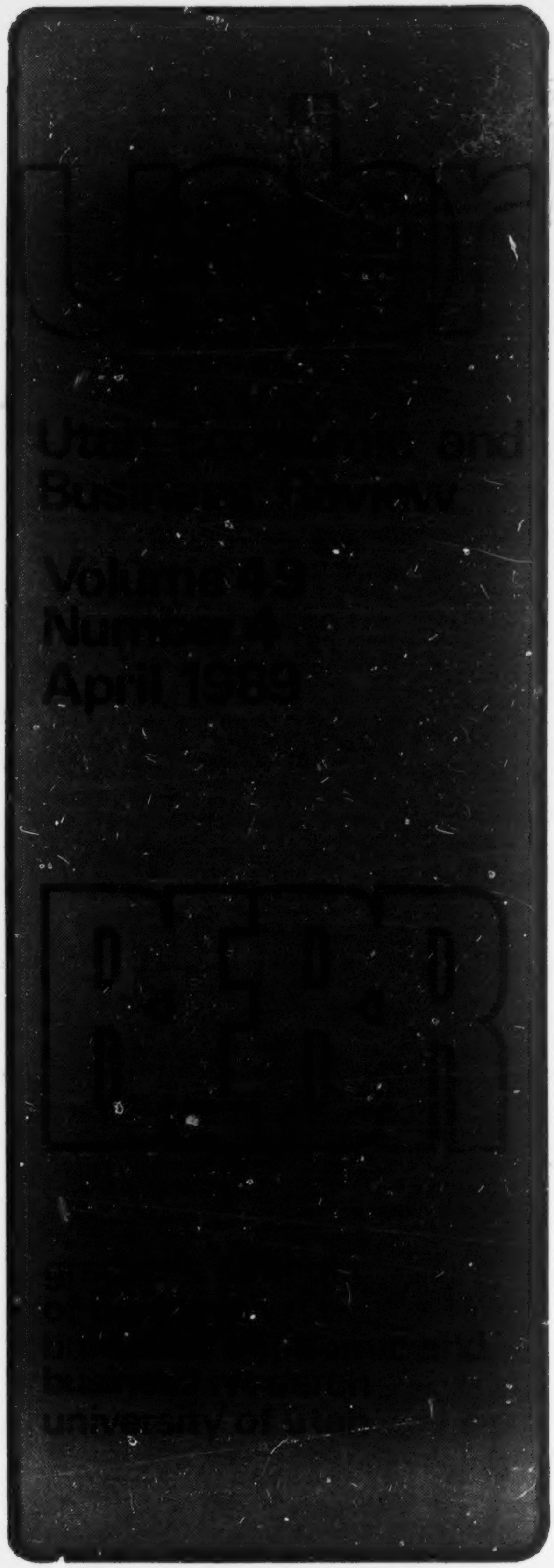

PERSONAL INCOME IN UTAH COUNTIES, 1987

Boyd L. Fjeldsted
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The Bureau of Economic and Business Research of the University of Utah has been designated by the United States Department of Commerce, Bureau of Economic Analysis to be a member of the BEA User Group. As such, the Bureau of Economic and Business Research annually receives unpublished BEA estimates of county personal income for the purpose of providing public dissemination of the information. The data in Table 1 have been obtained from the most recently released BEA county personal income estimates for the State of Utah.

Personal Income and Its Components

Personal Income is defined by the BEA to comprise the money value of current income received from all sources by, or on behalf of, persons residing in a given geographical area, including income received in both monetary and non-monetary forms. Specifically, personal income consists of:

- Wage and salary disbursements, excluding social security taxes and other personal contributions for social insurance paid by employees.
- Other labor income, which consists of employer contributions for private life and medical insurance, private retirement programs and other private "fringe" benefits.
- Net income of owners of unincorporated enterprises, excluding self-employed contributions for social security and other social insurance.
- Property income, including dividends, interest and rent.
- Transfer payments, i.e., personal payments by government or business for which no services are currently rendered.

Income derived from participation in the work force is referred to as *labor and proprietors' income* or *earnings* and includes (1) wage and salary disbursements, (2) other labor income and (3) net income of owners of unincorporated enterprises. *Net labor and proprietors' income* or *net earnings* is arrived at by deducting social security taxes and other social insurance contributions paid by workers, including self-employment contributions paid by owners of unincorporated enterprises.

Since wage and salary disbursements and other labor income are reported on a place-of-work basis, labor and proprietors' income must be adjusted for the effect of interarea commuting in order to arrive at the earnings component of personal income (which is defined on a place-of residence basis). This adjustment is accomplished by estimating the difference between the net earnings of persons who reside in a given area but who work in other areas, and the net earnings of persons who work in the given area but reside in other areas. This difference is referred to as the *residence adjustment*.

BEA Income Imputations

It should be noted that the BEA personal income estimates include imputations or allowances for the value of certain types of income realizations, even though no monetary transaction is involved. These include imputations for:

- wages and salaries paid in kind, i.e., in the form of food, clothing or lodging;
- rental value of owner occupied dwelling units;
- food and fuel produced and consumed on farms; and
- interest earned on money deposited with financial intermediaries for which no interest is actually paid or credited.

This last item includes, for example, an imputation for the interest earning potential of ordinary bank demand deposit accounts, even though banks do not ordinarily pay interest on such accounts. For the state as a whole, imputed interest amounts to roughly 35 percent of total interest, while imputed rent amounts to approximately 40 percent of total rent.

BEA Person Concept

It should be further noted that personal income as defined by the Bureau of Economic Analysis includes the income of certain legal entities not ordinarily regarded as "persons," including non-profit institutions serving individuals, private non-insured pension funds, health and welfare funds and private trust funds. In effect the current earnings of these organizations are credited directly to the ultimate beneficiaries for personal income accounting purposes. Since such organizations are considered to be persons, benefit payments by them to individuals are considered to be transfer payments among persons and not part of personal income. The undistributed earnings of life insurance carriers and private non-insured pension funds are also credited to persons for personal income accounting purposes.

County Income by Type and Industry

Table 1 presents the most recent Bureau of Economic Analysis county estimates of personal income broken down by type, and earnings broken down by industrial source. It should be stressed that personal income is presented on a place-of-residence basis, i.e., credited to the area of the recipient's residence, while labor and proprietors' income (earnings) is presented on a place-of-work basis, i.e., credited to the area in which the earning activity takes place.

Table 1 also reveals the industrial structure of income generation in Utah and its 29 counties. Somewhat surprising, perhaps, is the fact that in only five counties does farming account for more than 15 percent of total earnings. These five counties are Rich (with farming accounting for 47 percent of total earnings), Piute (40 percent), Beaver (22 percent), Morgan (17 percent), Sanpete (17 percent) and Wayne (17 percent). For the state as a whole, farming accounts for only about 1 percent of total earnings.

Those counties whose economies may be characterized as distinctly oriented toward mining (including oil and gas extraction) include Carbon (where the mining sector accounts for 36 percent of total earnings), Emery (36 percent), Uintah (19 percent) and San Juan (19 percent). Those counties whose economies have a distinctly manufacturing orientation include Box Elder (where manufacturing accounts for 70 percent of total earnings), Cache (28 percent), Morgan (22 percent) and Weber (20 percent).

There are two counties whose economies are dominated by the federal government: Tooele (where federal government accounts for 56 percent of total earnings) and Davis (41 percent). In Daggett the federal government accounts for 23 percent of total earnings; but in addition the state and local government sector accounts for 23 percent of total earnings—so that 46 percent of total earnings in Daggett comes from government employment.

There are only three counties for which property income and transfer payments account for 40 percent or more of total personal income. These are Piute (46 percent), Washington (43 percent) and Beaver (42 percent). The relatively high dependence of these counties on property income and transfer payments can be explained in part by the relatively high proportion of persons of retirement age in their populations. In 1980 Piute

County, for example, led the state with 17 percent of its population age 65 or over. Washington and Beaver Counties were not far behind, with 13 to 14 percent of their populations being age 65 or over (U.S. Department of Commerce, Bureau of the Census, 1980 Census Report PC80-1-B46, Table 44).

Growth Sectors and Growth Counties

For the state as a whole two major sectors showed substantial sustained growth in labor and proprietors' income over the five-year period 1982 through 1987: (1) finance, insurance and real estate, with a growth rate of 11 percent per annum and (2) services, also with a growth rate of 11 percent per annum. Though farming accounts for only about 1 percent of earnings in the State of Utah, the rate of growth in earnings in the farm sector actually exceeded that in finance, insurance and real estate and in services, with a five-year growth rate of 14 percent per annum. Two other sectors exhibited substantial rates of growth between 1982 and 1987: military, with a growth rate of 8 percent per annum and state and local government (7 percent per annum).

Those counties exhibiting growth rates during the five-year period that were substantially higher than the state average in the finance, insurance and real estate sector were Summit, with a growth rate of 26 percent per annum, Morgan (17 percent per annum) and Washington (13 percent per annum).

Those counties showing high sustained growth rates in the services sector were Daggett, with a growth rate of 24 percent per annum, Washington (17 percent per annum) and Wasatch (15 percent per annum).

Those counties experiencing rapid growth in the military sector were Weber, with a growth rate of 22 percent per annum, Millard (21 percent per annum) and Washington (18 percent per annum). However, between 1986 and 1987 military earnings in Weber County failed to increase.

Those counties exhibiting relatively rapid growth in state and local government earnings over the five-year period were Washington (with a growth rate of 13 percent per annum, Summit (11 percent) and Uintah (also 11 percent).

Four counties stood out in sustained relative growth in personal income over the five-year period: Washington recorded the highest, with a growth rate of 13 percent per annum, followed by Summit (10 percent per annum), Box Elder (9 percent per annum) and Wayne (8 percent per annum).

Per Capita Personal Income

Per capita personal income figures for Utah counties in 1987 are also shown in Table 1 (on the second line). Summit County had the highest per capita personal income at $15,906, followed by Weber ($12,622) Salt Lake ($12,567) and Box Elder ($12,506). A per capita personal income time series for the State of Utah from 1969 to 1988 is presented in Table 2. These data show that Utah's position advanced from 79 percent of the national average in 1969 to 83 percent of the national average by 1977, but has since slipped to only 73 percent of the national average. It should be noted that the estimates of per capita personal income in Table 2 are based on Bureau of the Census revised state population estimates, whereas the estimates of per capita personal income in Table 1 are based on estimates of county population that have not been revised to reflect the revision in the state population estimates. This accounts for the slight discrepancy between the estimated per capita personal income for the State of Utah as shown in Table 1 as compared to Table 2.

Table 2
Utah Per Capita Personal Income
1969-1988

Year	Amount (dollars)	Percent of U.S. Average	State Rank
1969	3,026	79	38
1970	3,297	81	38
1971	3,547	83	39
1972	3,861	83	39
1973	4,217	81	42
1974	4,613	82	42
1975	4,988	82	39
1976	5,513	83	39
1977	6,068	83	39
1978	6,766	83	40
1979	7,407	82	41
1980	7,952	80	45
1981	8,660	79	45
1982	9,041	79	45
1983	9,400	78	45
1984	10,120	77	46
1985	10,653	77	47
1986	10,988	75	48
1987	11,389	74	48
1988^p	12,013	73	48

^p preliminary

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	State of Utah			Beaver			Box Elder		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87
Income by Place of Residence									
Total personal income	19,129,330	100.0[a]	4.6	46,093	100.0[a]	3.6	475,961	100.0[a]	10.8
Per capita personal income (dollars)	11,386	73.6[b]	3.6	9,220	59.6[b]	3.5	12,506	80.8[b]	9.1
Derivation of total personal income:									
Total earnings by place of work	14,662,358	100.0[c]	4.1	27,625	100.0[c]	2.9	476,077	100.0[c]	14.7
Less: Contributions for social insurance	870,827	5.9[c]	3.5	1,485	5.4[c]	–4.7	27,636	5.8[c]	12.6
Plus: Residence adjustment	68,617	.5[c]	–9.7	617	2.2[c]	–1.2	–84,281	–17.7[c]	(U)
Equals: Net earnings by place of residence	13,860,148	72.5[a]	4.0	26,757	58.1[a]	3.3	364,160	76.5[a]	12.5
Plus: Dividends, interest, and rent	2,547,771	13.3[a]	4.8	8,839	19.2[a]	4.0	53,711	11.3[a]	4.3
Plus: Transfer payments	2,721,411	14.2[a]	7.6	10,497	22.8[a]	4.1	58,090	12.2[a]	6.8
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	12,081,334	82.4[c]	3.6	17,315	62.7[c]	–7.3	387,679	81.4[c]	13.6
Other labor income	1,079,974	7.4[c]	3.2	1,410	5.1[c]	–2.7	51,032	10.7[c]	14.9
Proprietors' income	1,501,050	10.2[c]	8.4	8,900	32.2[c]	32.8	37,366	7.8[c]	27.0
Farm	149,318	1.0[c]	37.8	4,941	17.9[c]	67.2	12,380	2.6[c]	112.6
Nonfarm	1,351,732	9.2[c]	5.9	3,959	14.3[c]	5.6	24,986	5.2[c]	5.9
Earnings by industry									
Farm	195,077	1.3[c]	27.7	6,062	21.9[c]	50.8	16,500	3.5[c]	67.7
Nonfarm	14,467,281	98.7[c]	3.8	21,563	78.1[c]	–5.4	459,577	96.5[c]	13.4
Private	11,357,502	77.5[c]	4.2	15,375	55.7[c]	–8.0	427,231	89.7[c]	14.1
Agricultural services and other	38,911	.3[c]	6.6	80	.3[c]	11.1	1,552	.3[c]	(U)
Mining	312,000	2.1[c]	2.0	(L)	(L)	(L)	276	.1[c]	(U)
Construction	955,273	6.5[c]	–8.5	1,498	5.4[c]	–37.1	18,920	4.0[c]	12.1
Manufacturing	2,402,757	16.4[c]	1.9	919	3.3[c]	139.3	333,295	70.0[c]	15.7
Nondurable goods	625,855	4.3[c]	7.8	(D)	(D)	(D)	2,601	.5[c]	55.4
Durable goods	1,776,902	12.1[c]	.0	(D)	(D)	(D)	330,694	69.5[c]	15.4
Transportation and public utilities	1,241,367	8.5[c]	3.7	5,144	18.6[c]	(U)	7,065	1.5[c]	3.9
Wholesale trade	887,513	6.1[c]	–1.6	259	.9[c]	–6.7	8,162	1.7[c]	.0
Retail trade	1,422,709	9.7[c]	2.7	3,108	11.3[c]	–1.2	24,330	5.1[c]	5.5
Finance, insurance, and real estate	819,441	5.6[c]	7.7	582	2.1[c]	1.9	4,720	1.0[c]	24.6
Services	3,277,531	22.4[c]	12.6	3,741	13.5[c]	(U)	28,911	6.1[c]	12.2
Government	3,109,779	21.2[c]	2.4	6,188	22.4[c]	1.3	32,346	6.8[c]	4.5
Federal civilian	1,053,205	7.2[c]	2.6	960	3.5[c]	–3.8	2,745	.6[c]	–1.2
Military	208,806	1.4[c]	4.4	210	.8[c]	10.5	1,629	.3[c]	5.9
State and local	1,847,768	12.6[c]	2.0	5,018	18.2[c]	2.0	27,972	5.9[c]	5.0

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Cache			Carbon			Daggett		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87
Income by Place of Residence									
Total personal income	667,912	100.0[a]	6.4	268,718	100.0[a]	2.1	8,940	100.0[a]	10.2
Per capita personal income (dollars)	10,181	65.8[b]	6.0	12,065	77.9[b]	3.3	10,444	67.5[b]	-3.4
Derivation of total personal income:									
Total earnings by place of work	455,963	100.0[c]	7.9	180,339	100.0[c]	-.1	5,581	100.0[c]	12.5
Less: Contributions for social insurance	26,185	5.7[c]	8.0	10,885	6.0[c]	-.4	299	5.4[c]	10.7
Plus: Residence adjustment	46,520	10.2[c]	-8.7	15,310	8.5[c]	13.4	1,456	26.1[c]	9.5
Equals: Net earnings by place of residence	476,298	71.3[a]	6.0	184,764	68.8[a]	.8	6,738	75.4[a]	11.9
Plus: Dividends, interest, and rent	95,314	14.3[a]	4.4	34,273	12.8[a]	4.7	954	10.7[a]	5.2
Plus: Transfer payments	96,300	14.4[a]	10.7	49,681	18.5[a]	5.5	1,248	14.0[a]	5.6
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	358,224	78.6[c]	7.5	145,856	80.9[c]	-.9	4,168	74.7[c]	11.1
Other labor income	35,878	7.9[c]	5.5	17,510	9.7[c]	-.3	378	6.8[c]	24.8
Proprietors' income	61,861	13.6[c]	11.6	16,973	9.4[c]	7.3	1,035	18.5[c]	14.1
Farm	10,755	2.4[c]	41.5	2,243	1.2[c]	15.1	227	4.1[c]	87.6
Nonfarm	51,106	11.2[c]	6.8	14,730	8.2[c]	6.3	808	14.5[c]	2.8
Earnings by industry									
Farm	15,058	3.3[c]	28.4	2,506	1.4[c]	13.1	292	5.2[c]	51.3
Nonfarm	440,905	96.7[c]	7.3	177,833	98.6[c]	-.2	5,289	94.8[c]	11.0
Private	318,240	69.8[c]	7.5	145,531	80.7[c]	-1.1	2,678	48.0[c]	21.3
Agricultural services and other	3,208	.7[c]	29.4	100	.1[c]	3.1	(D)	(D)	(D)
Mining	280	.1[c]	47.4	65,633	36.4[c]	2.0	(D)	(D)	(D)
Construction	35,678	7.8[c]	-5.1	7,709	4.3[c]	-14.8	257	4.6[c]	8.0
Manufacturing	125,835	27.6[c]	13.0	4,356	2.4[c]	2.4	(D)	(D)	(D)
Nondurable goods	88,237	19.4[c]	11.5	3,184	1.8[c]	1.7	(D)	(D)	(D)
Durable goods	37,598	8.2[c]	16.7	1,172	.6[c]	4.5	0	.0[c]	(U)
Transportation and public utilities	15,568	3.4[c]	10.7	13,942	7.7[c]	-16.0	1,050	18.8[c]	1.5
Wholesale trade	8,382	1.8[c]	5.1	7,051	3.9[c]	-14.7	0	.0[c]	(U)
Retail trade	38,161	8.4[c]	-.6	15,707	8.7[c]	-1.6	528	9.5[c]	62.0
Finance, insurance, and real estate	12,997	2.9[c]	8.9	4,003	2.2[c]	8.5	(L)	(L)	(L)
Services	78,131	17.1[c]	8.6	27,030	15.0[c]	8.3	766	13.7[c]	26.8
Government	122,665	26.9[c]	6.8	32,302	17.9[c]	3.7	2,611	46.8[c]	2.0
Federal civilian	8,032	1.8[c]	2.3	5,553	3.1[c]	7.2	1,281	23.0[c]	7.3
Military	3,678	.8[c]	12.9	940	.5[c]	10.7	(L)	(L)	(L)
State and local	110,955	24.3[c]	7.0	25,809	14.3[c]	2.8	1,300	23.3[c]	-2.7

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Davis			Duchesne			Emery		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87
Income by Place of Residence									
Total personal income	2,022,922	100.0[a]	5.2	140,838	100.0[a]	1.1	102,008	100.0[a]	.2
Per capita personal income (dollars)	11,211	72.4[b]	2.1	9,805	63.3[b]	6.8	8,607	55.6[b]	1.9
Derivation of total personal income:									
Total earnings by place of work	1,352,503	100.0[c]	-.3	100,155	100.0[c]	.5	111,843	100.0[c]	-7.4
Less: Contributions for social insurance	75,194	5.6[c]	-2.4	5,501	5.5[c]	-.9	6,389	5.7[c]	-8.4
Plus: Residence adjustment	277,116	20.5[c]	33.8	6,233	6.2[c]	-8.2	-29,671	-26.5[c]	(U)
Equals: Net earnings by place of residence	1,554,425	76.8[a]	4.5	100,887	71.6[a]	.0	75,783	74.3[a]	-1.3
Plus: Dividends, interest, and rent	210,084	10.4[a]	4.9	18,233	12.9[a]	3.8	9,682	9.5[a]	6.0
Plus: Transfer payments	258,413	12.8[a]	9.5	21,718	15.4[a]	4.3	16,543	16.2[a]	4.8
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	1,147,823	84.9[c]	-1.2	69,395	69.3[c]	-2.8	89,842	80.3[c]	-8.3
Other labor income	83,889	6.2[c]	1.8	6,567	6.6[c]	-9.6	12,465	11.1[c]	-12.2
Proprietors' income	120,791	8.9[c]	8.0	24,193	24.2[c]	15.6	9,536	8.5[c]	11.7
Farm	9,148	.7[c]	41.4	6,543	6.5[c]	52.9	3,186	2.8[c]	38.9
Nonfarm	111,643	8.3[c]	6.0	17,650	17.6[c]	6.0	6,350	5.7[c]	1.7
Earnings by industry									
Farm	11,463	.8[c]	31.5	7,665	7.7[c]	42.6	3,602	3.2[c]	32.8
Nonfarm	1,341,040	99.2[c]	-.5	92,490	92.3[c]	-1.8	108,241	96.8[c]	-8.3
Private	676,893	50.0[c]	-1.5	71,279	71.2[c]	-2.1	94,549	84.5[c]	-9.9
Agricultural services and other	2,877	.2[c]	18.2	303	.3[c]	-.2	131	.1[c]	18.0
Mining	1,902	.1[c]	19.8	10,618	10.6[c]	-40.6	39,668	35.5[c]	-20.2
Construction	83,476	6.2[c]	-25.6	17,954	17.9[c]	98.8	8,801	7.9[c]	58.5
Manufacturing	152,247	11.3[c]	-8.4	3,299	3.3[c]	-51.2	173	.2[c]	154.4
Nondurable goods	49,836	3.7[c]	11.7	2,024	2.0[c]	-63.0	(D)	(D)	(D)
Durable goods	102,411	7.6[c]	-15.8	1,275	1.3[c]	-1.0	(D)	(D)	(D)
Transportation and public utilities	44.113	3.3[c]	-2.0	12,002	12.0[c]	11.8	34,411	30.8[c]	-10.1
Wholesale trade	48,383	3.6[c]	5.5	3,645	3.6[c]	-16.3	612	.5[c]	-9.5
Retail trade	108,087	8.0[c]	5.4	7,778	7.8[c]	-3.8	3,143	2.8[c]	2.1
Finance, insurance, and real estate	27,918	2.1[c]	9.7	1,667	1.7[c]	1.9	734	.7[c]	4.3
Services	207,890	15.4[c]	11.5	14,013	14.0[c]	.0	6,876	6.1[c]	.9
Government	664,147	49.1[c]	.5	21,211	21.2[c]	-.8	13,692	12.2[c]	4.6
Federal civilian	435,786	32.2[c]	-.9	4,636	4.6[c]	-10.2	1,248	1.1[c]	.9
Military	118,042	8.7[c]	4.2	624	.6[c]	10.8	508	.5[c]	10.9
State and local	110,319	8.2[c]	3.0	15,951	15.9[c]	1.7	11,936	10.7[c]	4.8

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Garfield			Grand			Iron		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87
Income by Place of Residence									
Total personal income	41,455	100.0[a]	3.0	77,708	100.0[a]	2.6	168,935	100.0[a]	5.2
Per capita personal income (dollars)	9,882	63.8[b]	2.0	11,456	74.0[b]	4.7	8,650	55.9[b]	5.6
Derivation of total personal income:									
Total earnings by place of work	26,848	100.0[c]	1.9	44,904	100.0[c]	.7	120,274	100.0[c]	4.3
Less: Contributions for social insurance	1,450	5.4[c]	.3	2,655	5.9[c]	.8	6,812	5.7[c]	3.4
Plus: Residence adjustment	1,430	5.3[c]	16.4	8,560	19.1[c]	.8	-436	-.4[c]	(U)
Equals: Net earnings by place of residence	26,828	64.7[a]	2.7	50,809	65.4[a]	.7	113,026	66.9[a]	4.4
Plus: Dividends, interest, and rent	7,024	16.9[a]	4.1	12,291	15.8[a]	5.9	25,048	14.8[a]	4.4
Plus: Transfer payments	7,603	18.3[a]	3.1	14,608	18.8[a]	6.6	30,861	18.3[a]	9.0
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	18,958	70.6[c]	-2.3	30,032	66.9[c]	-1.2	89,898	74.7[c]	2.5
Other labor income	1,719	6.4[c]	2.2	2,494	5.6[c]	-3.9	7,678	6.4[c]	1.5
Proprietors' income	6,171	23.0[c]	18.1	12,378	27.6[c]	7.2	22,698	18.9[c]	13.3
Farm	3,118	11.6[c]	24.6	919	2.0[c]	55.0	5,570	4.6[c]	49.2
Nonfarm	3,053	11.4[c]	12.2	11,459	25.5[c]	4.6	17,128	14.2[c]	5.1
Earnings by industry									
Farm	3,484	13.0[c]	21.3	1,146	2.6[c]	37.9	7,150	5.9[c]	35.4
Nonfarm	23,364	87.0[c]	-.3	43,758	97.4[c]	.0	113,124	94.1[c]	2.8
Private	16,103	60.0[c]	.8	33,309	74.2[c]	-1.8	78,831	65.5[c]	1.8
Agricultural services and other	(D)	(D)	(D)	59	.1[c]	7.3	1,548	1.3[c]	(U)
Mining	(D)	(D)	(D)	5,106	11.4[c]	-8.3	4,187	3.5[c]	(U)
Construction	1,040	3.9[c]	-47.6	3,657	8.1[c]	-26.4	8,021	6.7[c]	-14.8
Manufacturing	4,733	17.6[c]	7.4	819	1.8[c]	-9.0	4,404	3.7[c]	-34.3
Nondurable goods	(D)	(D)	(D)	277	.6[c]	-46.6	2,851	2.4[c]	-22.2
Durable goods	(D)	(D)	(D)	542	1.2[c]	42.3	1,553	1.3[c]	-48.9
Transportation and public utilities	2,049	7.6[c]	-2.0	5,045	11.2[c]	7.4	9,525	7.9[c]	13.3
Wholesale trade	(L)	(L)	(L)	1,357	3.0[c]	-6.1	3,459	2.9[c]	.5
Retail trade	1,781	6.6[c]	12.4	5,330	11.9[c]	7.2	18,337	15.2[c]	5.3
Finance, insurance, and real estate	507	1.9[c]	13.2	1,217	2.7[c]	-5.0	4,971	4.1[c]	-13.0
Services	5,426	20.2[c]	11.0	10,719	23.9[c]	6.8	24,379	20.3[c]	12.1
Government	7,261	27.0[c]	-2.9	10,449	23.3[c]	6.5	34,293	28.5[c]	5.1
Federal civilian	3,105	11.6[c]	1.2	4,500	10.0[c]	16.4	8,878	7.4[c]	15.4
Military	167	.6[c]	10.6	297	.7[c]	11.2	801	.7[c]	10.9
State and local	3,989	14.9[c]	-6.4	5,652	12.6[c]	-.3	24,614	20.5[c]	1.7

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Juab			Kane			Millard		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87
Income by Place of Residence									
Total personal income	48,621	100.0^{a}	2.7	49,044	100.0^{a}	4.7	122,577	100.0^{a}	–10.5
Per capita personal income (dollars)	8,162	52.7^{b}	5.4	10,019	64.7^{b}	1.4	9,521	61.5^{b}	–2.6
Derivation of total personal income:									
Total earnings by place of work	26,345	100.0^{c}	4.8	23,683	100.0^{c}	6.2	98,375	100.0^{c}	–21.1
Less: Contributions for social insurance	1,511	5.7^{c}	5.1	1,440	6.1^{c}	6.5	5,289	5.4^{c}	–25.0
Plus: Residence adjustment	5,305	20.1^{c}	–9.5	8,934	37.7^{c}	–1.4	–6,338	–6.4^{c}	(U)
Equals: Net earnings by place of residence	30,139	62.0^{a}	2.0	31,177	63.6^{a}	3.9	86,748	70.8^{a}	–15.1
Plus: Dividends, interest, and rent	7,639	15.7^{a}	4.6	9,201	18.8^{a}	4.0	18,574	15.2^{a}	3.9
Plus: Transfer payments	10,843	22.3^{a}	3.5	8,666	17.7^{a}	8.5	17,255	14.1^{a}	2.3
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	17,832	67.7^{c}	3.1	17,173	72.5^{c}	4.6	69,708	70.9^{c}	–28.4
Other labor income	1,489	5.7^{c}	7.8	1,215	5.1^{c}	8.7	7,968	8.1^{c}	–25.5
Proprietors' income	7,024	26.7^{c}	9.0	5,295	22.4^{c}	11.1	20,699	21.0^{c}	25.2
Farm	2,568	9.7^{c}	21.8	994	4.2^{c}	30.8	8,355	8.5^{c}	66.5
Nonfarm	4,456	16.9^{c}	2.8	4,301	18.2^{c}	7.4	12,344	12.5^{c}	7.3
Earnings by industry									
Farm	3,187	12.1^{c}	17.6	1,223	5.2^{c}	21.4	11,122	11.3^{c}	44.6
Nonfarm	23,158	87.9^{c}	3.3	22,460	94.8^{c}	5.5	87,253	88.7^{c}	–25.4
Private	17,074	64.8^{c}	4.3	16,423	69.3^{c}	6.5	74,361	75.6^{c}	–27.7
Agricultural services and other	(L)	(L)	(L)	(D)	(D)	(D)	601	.6^{c}	14.9
Mining	(D)	(D)	(D)	(D)	(D)	(D)	4,364	4.4^{c}	–.5
Construction	(D)	(D)	(D)	1,424	6.0^{c}	8.1	14,988	15.2^{c}	–67.1
Manufacturing	3,207	12.2^{c}	19.3	796	3.4^{c}	–2.1	5,183	5.3^{c}	–22.5
Nondurable goods	(D)	(D)	(D)	(D)	(D)	(D)	1,115	1.1^{c}	–19.7
Durable goods	(D)	(D)	(D)	(D)	(D)	(D)	4,068	4.1^{c}	–23.2
Transportation and public utilities	797	3.0^{c}	3.9	1,189	5.0^{c}	10.3	29,988	30.5^{c}	(U)
Wholesale trade	1,686	6.4^{c}	–3.4	1,212	5.1^{c}	1.3	1,252	1.3^{c}	–10.9
Retail trade	3,470	13.2^{c}	–5.2	3,859	16.3^{c}	4.5	6,603	6.7^{c}	–12.9
Finance, insurance, and real estate	695	2.6^{c}	5.0	688	2.9^{c}	22.4	1,653	1.7^{c}	–8.5
Services	4,960	18.8^{c}	10.1	7,113	30.0^{c}	7.2	9,729	9.9^{c}	(U)
Government	6,084	23.1^{c}	.6	6,037	25.5^{c}	3.0	12,892	13.1^{c}	–8.3
Federal civilian	542	2.1^{c}	8.8	1,478	6.2^{c}	2.9	2,176	2.2^{c}	–.5
Military	246	.9^{c}	10.8	191	.8^{c}	10.4	589	.6^{c}	10.9
State and local	5,296	20.1^{c}	–.5	4,368	18.4^{c}	2.7	10,127	10.3^{c}	–10.7

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Morgan			Piute			Rich		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87
Income by Place of Residence									
Total personal income	66,181	100.0[a]	6.0	12,082	100.0[a]	9.9	22,212	100.0[a]	12.3
Per capita personal income (dollars)	12,097	78.1[b]	2.5	8,449	54.6[b]	14.0	10,255	66.2[b]	15.7
Derivation of total personal income.									
Total earnings by place of work	26,981	100.0[c]	2.6	5,426	100.0[c]	25.2	9,089	100.0[c]	37.3
Less: Contributions for social insurance	1,404	5.2[c]	3.4	241	4.4[c]	18.7	310	3.4[c]	.6
Plus: Residence adjustment	23,923	88.7[c]	9.5	1,313	24.2[c]	-8.3	5,980	65.8[c]	-5.1
Equals: Net earnings by place of residence	49,500	74.8[a]	5.8	6,498	53.8[a]	16.8	14,759	66.4[a]	16.9
Plus: Dividends, interest, and rent	7,823	11.8[a]	4.6	2,426	20.1[a]	3.9	4,794	21.6[a]	4.7
Plus: Transfer payments	8,858	13.4[a]	8.4	3,158	26.1[a]	1.9	2,659	12.0[a]	3.2
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	18,391	68.2[c]	2.1	2,642	48.7[c]	19.2	4,840	53.3[c]	-1.5
Other labor income	1,588	5.9[c]	2.3	178	3.3[c]	14.8	361	4.0[c]	-3.4
Proprietors' income	7,002	26.0[c]	4.3	2,606	48.0[c]	32.8	3,888	42.8[c]	192.6
Farm	3,202	11.9[c]	1.1	1,915	35.3[c]	45.6	3,213	35.4[c]	366.3
Nonfarm	3,800	14.1[c]	7.2	691	12.7[c]	6.6	675	7.4[c]	5.5
Earnings by industry									
Farm	4,686	17.4[c]	2.4	2,150	39.6[c]	40.0	4,298	47.3[c]	146.4
Nonfarm	22,295	82.6[c]	2.7	3,276	60.4[c]	17.0	4,791	52.7[c]	-1.7
Private	18,101	67.1[c]	2.5	1,595	29.4[c]	18.4	2,309	25.4[c]	-5.5
Agricultural services and other	56	.2[c]	(U)	(L)	(L)	(L)	98	1.1[c]	19.5
Mining	62	.2[c]	(U)	(L)	(L)	(L)	(D)	(D)	(D)
Construction	2,736	10.1[c]	10.2	293	5.4[c]	-6.0	346	3.8[c]	9.5
Manufacturing	5,965	22.1[c]	-3.0	286	5.3[c]	64.4	(D)	(D)	(D)
Nondurable goods	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Durable goods	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Transportation and public utilities	575	2.1[c]	-5.0	192	3.5[c]	15.0	381	4.2[c]	-5.1
Wholesale trade	4,059	15.0[c]	-.5	(L)	(L)	(L)	(D)	(D)	(D)
Retail trade	1,498	5.6[c]	12.4	106	2.0[c]	27.7	394	4.3[c]	-7.4
Finance, insurance, and real estate	592	2.2[c]	6.3	129	2.4[c]	69.7	(D)	(D)	(D)
Services	2,558	9.5[c]	8.3	491	9.0[c]	11.6	662	7.3[c]	5.4
Government	4,194	15.5[c]	3.6	1,681	31.0[c]	15.8	2,482	27.3[c]	2.1
Federal civilian	226	.8[c]	3.7	132	2.4[c]	2.3	297	3.3[c]	.7
Military	214	.8[c]	10.9	60	1.1[c]	11.1	96	1.1[c]	10.3
State and local	3,754	13.9[c]	3.2	1,489	27.4[c]	17.3	2,089	23.0[c]	1.9

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Salt Lake			San Juan			Sanpete		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87
Income by Place of Residence									
Total personal income	8,970,026	100.0[a]	4.5	85,337	100.0[a]	6.8	138,173	100.0[a]	4.5
Per capita personal income (dollars)	12,567	81.2[b]	3.5	7,414	47.9[b]	9.0	8,372	54.1[b]	5.0
Derivation of total personal income:									
Total earnings by place of work	7,758,609	100.0[c]	4.8	63,375	100.0[c]	8.3	74,734	100.0[c]	7.8
Less: Contributions for social insurance	469,702	6.1[c]	4.5	3,454	5.5[c]	6.7	3,955	5.3[c]	9.2
Plus: Residence adjustment	–697,589	–9.0[c]	(U)	–5,257	–8.3[c]	(U)	18,664	25.0[c]	–5.5
Equals: Net earnings by place of residence	6,591,318	73.5[a]	3.9	54,664	64.1[a]	7.2	89,443	64.7[a]	4.7
Plus: Dividends, interest, and rent	1,255,496	14.0[a]	5.0	9,967	11.7[a]	5.3	20,022	14.5[a]	4.7
Plus: Transfer payments	1,123,212	12.5[a]	7.7	20,706	24.3[a]	6.5	28,708	20.8[a]	3.8
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	6,563,264	84.6[c]	4.8	48,121	75.9[c]	6.4	49,965	66.9[c]	7.2
Other labor income	586,660	7.6[c]	3.9	4,409	7.0[c]	9.9	4,790	6.4[c]	9.8
Proprietors' income	608,685	7.8[c]	5.8	10,845	17.1[c]	16.9	19,979	26.7[c]	8.9
Farm	6,581	.1[c]	–4.8	4,520	7.1[c]	37.8	9,720	13.0[c]	11.9
Nonfarm	602,104	7.8[c]	5.9	6,325	10.0[c]	5.5	10,259	13.7[c]	6.2
Earnings by industry									
Farm	10,444	.1[c]	–2.3	5,253	8.3[c]	31.3	12,859	17.2[c]	9.2
Nonfarm	7,748,165	99.9[c]	4.8	58,122	91.7[c]	6.6	61,875	82.8[c]	7.6
Private	6,536,521	84.2[c]	5.3	40,080	63.2[c]	7.9	41,347	55.3[c]	8.4
Agricultural services and other	16,426	.2[c]	–2.6	75	.1[c]	15.4	508	.7[c]	14.7
Mining	103,062	1.3[c]	33.7	11,899	18.8[c]	.0	263	.4[c]	21.8
Construction	482,207	6.2[c]	–7.5	6,316	10.0[c]	38.1	5,338	7.1[c]	2.0
Manufacturing	1,198,729	15.5[c]	2.4	2,227	3.5[c]	25.9	12,018	16.1[c]	8.1
Nondurable goods	284,597	3.7[c]	8.1	1,179	1.9[c]	14.0	10,111	13.5[c]	21.1
Durable goods	914,132	11.8[c]	.7	1,048	1.7[c]	42.6	1,907	2.6[c]	–31.1
Transportation and public utilities	834,250	10.8[c]	6.5	2,833	4.5[c]	–2.0	4,064	5.4[c]	5.5
Wholesale trade	689,562	8.9[c]	–2.9	(D)	(D)	(D)	1,036	1.4[c]	49.9
Retail trade	798,725	10.3[c]	3.4	4,179	6.6[c]	12.4	6,209	8.3[c]	10.3
Finance, insurance, and real estate	615,668	7.9[c]	7.1	(D)	(D)	(D)	2,010	2.7[c]	7.9
Services	1,797,892	23.2[c]	13.6	10,900	17.2[c]	2.2	9,901	13.2[c]	8.9
Government	1,211,644	15.6[c]	2.4	18,042	28.5[c]	4.0	20,528	27.5[c]	5.9
Federal civilian	215,459	2.8[c]	4.1	3,942	6.2[c]	16.1	2,020	2.7[c]	.9
Military	43,273	.6[c]	6.7	465	.7[c]	11.0	681	.9[c]	10.9
State and local	952,912	12.3[c]	1.8	13,635	21.5[c]	.7	17,827	23.9[c]	6.3

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Sevier			Summit			Tooele		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986-87
Income by Place of Residence									
Total personal income	158,333	100.0[a]	6.5	212,888	100.0[a]	5.6	335,460	100.0[a]	3.6
Per capita personal income (dollars)	10,157	65.6[b]	7.3	15,906	102.8[b]	2.8	11,580	74.8[b]	3.7
Derivation of total personal income:									
Total earnings by place of work	111,568	100.0[c]	7.9	125,919	100.0[c]	10.5	277,778	100.0[c]	.8
Less: Contributions for social insurance	6,413	5.7[c]	6.6	7,171	5.7[c]	10.6	15,063	5.4[c]	-2.9
Plus: Residence adjustment	819	.7[c]	-38.8	50,107	39.8[c]	-3.9	-9,759	-3.5[c]	(U)
Equals: Net earnings by place of residence	105,974	66.9[a]	7.3	168,855	79.3[a]	5.8	252,956	75.4[a]	2.9
Plus: Dividends, interest, and rent	22,674	14.3[a]	4.5	28,731	13.5[a]	5.0	26,259	7.8[a]	4.9
Plus: Transfer payments	29,685	18.7[a]	5.0	15,302	7.2[a]	5.2	56,245	16.8[a]	6.0
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	81,454	73.0[c]	6.0	93,641	74.4[c]	11.2	242,698	87.4[c]	.0
Other labor income	8,206	7.4[c]	6.2	6,520	5.2[c]	11.1	17,690	6.4[c]	8.6
Proprietors' income	21,908	19.6[c]	16.4	25,758	20.5[c]	7.8	17,390	6.3[c]	6.2
Farm	5,676	5.1[c]	68.9	6,245	5.0[c]	17.8	3,893	1.4[c]	13.7
Nonfarm	16,232	14.5[c]	5.0	19,513	15.5[c]	5.0	13,497	4.9[c]	4.2
Earnings by industry									
Farm	7,396	6.6[c]	47.6	7,529	6.0[c]	14.6	4,858	1.7[c]	11.0
Nonfarm	104,172	93.4[c]	5.9	118,390	94.0[c]	10.3	272,920	98.3[c]	.6
Private	81,985	73.5[c]	7.2	101,377	80.5[c]	11.2	93,199	33.6[c]	-4.3
Agricultural services and other	121	.1[c]	-1.5	762	.6[c]	-1.1	306	.1[c]	-19.4
Mining	11,320	10.1[c]	-.5	2,939	2.3[c]	-21.0	(D)	(D)	(D)
Construction	9,966	8.9[c]	76.2	8,744	6.9[c]	-1.9	(D)	(D)	(D)
Manufacturing	9,091	8.1[c]	-2.8	3,189	2.5[c]	-3.4	26,605	9.6[c]	-14.8
Nondurable goods	1,797	1.6[c]	34.9	652	.5[c]	26.6	24,360	8.8[c]	-15.3
Durable goods	7,294	6.5[c]	-9.1	2,537	2.0[c]	-8.9	2,245	.8[c]	-8.4
Transportation and public utilities	17,582	15.8[c]	-2.1	6,907	5.5[c]	-4.2	9,239	3.3[c]	7.8
Wholesale trade	3,574	3.2[c]	-2.5	1,890	1.5[c]	12.2	693	.2[c]	.7
Retail trade	11,684	10.5[c]	2.5	16,180	12.8[c]	5.2	12,113	4.4[c]	.0
Finance, insurance, and real estate	3,521	3.2[c]	8.4	15,596	12.4[c]	51.0	2,754	1.0[c]	6.9
Services	15,126	13.6[c]	10.8	45,170	35.9[c]	13.5	22,746	8.2[c]	-4.1
Government	22,187	19.9[c]	1.2	17,013	13.5[c]	4.8	179,721	64.7[c]	3.4
Federal civilian	5,554	5.0[c]	1.4	1,357	1.1[c]	7.4	150,735	54.3[c]	4.0
Military	651	.6[c]	10.9	526	.4[c]	10.7	8,960	3.2[c]	-10.3
State and local	15,982	14.3[c]	.8	15,130	12.0[c]	4.3	20,026	7.2[c]	6.6

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Uintah			Utah			Wasatch		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87
Income by Place of Residence									
Total personal income	215,194	100.0[a]	.2	2,144,980	100.0[a]	4.2	100,318	100.0[a]	4.3
Per capita personal income (dollars)	9,395	60.7[b]	5.3	8,870	57.3[b]	3.3	10,283	66.4[b]	2.7
Derivation of total personal income:									
Total earnings by place of work	171,221	100.0[c]	-1.4	1,472,950	100.0[c]	4.2	42,256	100.0[c]	12.4
Less: Contributions for social insurance	9,697	5.7[c]	-2.8	89,032	6.0[c]	4.9	2,431	5.8[c]	15.0
Plus: Residence adjustment	-530	-.3[c]	(U)	169,234	11.5[c]	-1.2	31,039	73.5[c]	-4.8
Equals: Net earnings by place of residence	160,994	74.8[a]	-.9	1,553,152	72.4[a]	3.6	70,864	70.6[a]	4.0
Plus: Dividends, interest, and rent	24,611	11.4[a]	4.6	270,227	12.6[a]	4.6	14,146	14.1[a]	4.5
Plus: Transfer payments	29,589	13.7[a]	3.5	321,601	15.0[a]	6.9	15,308	15.3[a]	5.5
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	122,230	71.4[c]	-4.1	1,169,142	79.4[c]	4.3	28,711	67.9[c]	13.7
Other labor income	10,233	6.0[c]	-3.4	99,816	6.8[c]	-1.1	2,200	5.2[c]	18.0
Proprietors' income	38,758	22.6[c]	8.9	203,992	13.8[c]	6.7	11,345	26.8[c]	8.3
Farm	8,111	4.7[c]	38.8	11,591	.8[c]	16.4	2,233	5.3[c]	21.8
Nonfarm	30,647	17.9[c]	3.0	192,401	13.1[c]	6.2	9,112	21.6[c]	5.5
Earnings by industry									
Farm	9,014	5.3[c]	34.1	18,675	1.3[c]	11.1	3,288	7.8[c]	15.6
Nonfarm	162,207	94.7[c]	-2.8	1,454,275	98.7[c]	4.1	38,968	92.2[c]	12.2
Private	131,072	76.6[c]	-4.4	1,208,024	82.0[c]	5.0	28,725	68.0[c]	23.7
Agricultural services and other	425	.2[c]	35.4	4,346	.3[c]	17.8	213	.5[c]	-6.5
Mining	32,419	18.9[c]	-8.1	1,320	.1[c]	24.8	(L)	(L)	(L)
Construction	11,878	6.9[c]	-22.3	100,739	6.8[c]	-1.3	6,843	16.2[c]	52.4
Manufacturing	4,543	2.7[c]	29.9	235,931	16.0[c]	-8.3	880	2.1[c]	2.4
Nondurable goods	981	.6[c]	-1.3	53,704	3.6[c]	19.5	(D)	(D)	(D)
Durable goods	3,562	2.1[c]	42.4	182,227	12.4[c]	-14.2	(D)	(D)	(D)
Transportation and public utilities	23,425	13.7[c]	2.0	73,090	5.0[c]	4.3	2,448	5.8[c]	2.6
Wholesale trade	7,804	4.6[c]	-13.7	41,468	2.8[c]	11.6	2,641	6.3[c]	4.3
Retail trade	14,725	8.6[c]	-1.4	145,029	9.8[c]	3.4	5,229	12.4[c]	3.8
Finance, insurance, and real estate	2,437	1.4[c]	2.2	50,106	3.4[c]	9.1	1,038	2.5[c]	3.9
Services	33,416	19.5[c]	.0	555,995	37.7[c]	12.9	9,401	22.2[c]	40.9
Government	31,135	18.2[c]	4.4	246,251	16.7[c]	.0	10,243	24.2[c]	-11.0
Federal civilian	9,504	5.6[c]	6.8	20,529	1.4[c]	3.9	1,485	3.5[c]	9.9
Military	1,034	.6[c]	10.8	10,517	.7[c]	9.0	392	.9[c]	10.7
State and local	20,597	12.0[c]	3.1	215,205	14.6[c]	-.6	8,366	19.8[c]	-14.6

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Table 1 (continued)
Personal Income and Earnings in Utah Counties by Type and Industrial Source, 1987

	Washington			Wayne			Weber		
	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87	Income/ Earnings ($1,000)	Components as Percent of Totals	Percent Change 1986–87
Income by Place of Residence									
Total personal income	381,800	100.0[a]	6.8	21,424	100.0[a]	16.2	2,023,190	100.0[a]	4.8
Per capita personal income (dollars)	9,177	59.3[b]	–.2	9,886	63.9[b]	11.8	12,622	81.5[b]	4.0
Derivation of total personal income:									
Total earnings by place of work	220,641	100.0[c]	6.4	13,414	100.0[c]	27.4	1,237,882	100.0[c]	3.2
Less: Contributions for social insurance	13,748	6.2[c]	7.6	691	5.2[c]	25.2	74,784	6.0[c]	2.3
Plus: Residence adjustment	12,280	5.6[c]	1.9	1,085	8.1[c]	–12.8	216,553	17.5[c]	7.5
Equals: Net earnings by place of residence	219,173	57.4[a]	6.1	13,808	64.5[a]	23.0	1,379,651	68.2[a]	3.9
Plus: Dividends, interest, and rent	83,071	21.8[a]	4.3	3,510	16.4[a]	4.4	263,147	13.0[a]	4.9
Plus: Transfer payments	79,556	20.8[a]	11.9	4,106	19.2[a]	6.6	380,392	18.8[a]	7.9
Earnings by Place of Work									
Components of earnings									
Wage and salary disbursements	157,295	71.3[c]	7.2	8,242	61.4[c]	27.8	1,026,795	82.9[c]	2.6
Other labor income	13,113	5.9[c]	6.1	756	5.6[c]	42.4	91,762	7.4[c]	3.1
Proprietors' income	50,233	22.8[c]	4.0	4,416	32.9[c]	24.4	119,325	9.6[c]	8.5
Farm	3,089	1.4[c]	15.0	2,005	14.9[c]	46.5	6,377	.5[c]	49.2
Nonfarm	47,144	21.4[c]	3.4	2,411	18.0[c]	10.5	112,948	9.1[c]	6.9
Earnings by industry									
Farm	3,589	1.6[c]	12.8	2,222	16.6[c]	40.0	8,356	.7[c]	35.5
Nonfarm	217,052	98.4[c]	6.3	11,192	83.4[c]	25.1	1,229,526	99.3[c]	3.0
Private	176,595	80.0[c]	5.6	7,101	52.9[c]	41.4	901,594	72.8[c]	2.4
Agricultural services and other	1,943	.9[c]	4.2	(L)	(L)	(L)	3,069	.2[c]	11.7
Mining	1,779	.8[c]	–16.9	82	.6[c]	(U)	2,519	.2[c]	–7.3
Construction	31,836	14.4[c]	–1.6	3,653	27.2[c]	89.2	71,426	5.8[c]	–4.2
Manufacturing	18,473	8.4[c]	10.5	625	4.7[c]	40.4	244,763	19.8[c]	.2
Nondurable goods	11,138	5.0[c]	1.8	(D)	(D)	(D)	82,306	6.6[c]	7.0
Durable goods	7,335	3.3[c]	26.9	(D)	(D)	(D)	162,457	13.1[c]	–2.8
Transportation and public utilities	15,729	7.1[c]	–.4	915	6.8[c]	27.3	67,849	5.5[c]	–13.3
Wholesale trade	8,926	4.0[c]	14.9	418	3.1[c]	–5.3	38,745	3.1[c]	1.6
Retail trade	34,332	15.6[c]	–.4	483	3.6[c]	7.6	131,601	10.6[c]	–1.0
Finance, insurance, and real estate	9,278	4.2[c]	4.7	65	.5[c]	(U)	53,144	4.3[c]	6.8
Services	54,299	24.6[c]	15.3	812	6.1[c]	12.6	288,478	23.3[c]	12.3
Government	40,457	18.3[c]	9.4	4,091	30.5[c]	4.4	327,932	26.5[c]	4.9
Federal civilian	6,915	3.1[c]	9.0	2,139	15.9[c]	7.5	151,991	12.3[c]	8.4
Military	1,450	.7[c]	10.8	88	.7[c]	10.0	12,447	1.0[c]	.0
State and local	32,092	14.5[c]	9.4	1,864	13.9[c]	.8	163,494	13.2[c]	2.1

[a] Income components as a percent of total personal income.
[b] Per capita personal income as a percent of U.S. average.
[c] Earnings components as a percent of total earnings.

(D) Not shown to avoid disclosure of confidential information.
(L) Less than $50,000. Data included in totals.
(U) Unable to calculate due to zero or negative data.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economics Information System.

Utah Business Statistics

UTAH DATA	Jan. 1988	Jan. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,535	NA	NA	NA	19,115	NA
New Corporations (no.)	498	556	11.6%	467	463	0.9%
New Car, Truck, and Motor Home Sales (no.)	4,870	4,761	-2.2%	5,213	4,936	5.6%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	64.20	74.10	15.4%	68.83	64.07	7.4%
Lambs (cwt)	81.00	62.00	23.5%	62.23	73.06	-14.8%
Milk Wholesale (cwt)	12.10	12.70	5.0%	11.70	11.89	-1.6%
Alfalfa Hay, Baled (per ton)	74.00	84.00	13.5%	76.42	68.00	12.4%
Cattle Slaughtered (live weight) (thous. of lbs.)	46,229	47,767	3.3%	46,716	42,166	10.8%
Construction						
Total Construction (thous. of dol.) 1	86,235	54,334	37.0%	118,315	118,792	0.4%
Residential	30,945	27,299	11.8%	47,409	48,355	2.0%
Nonresidential	49,082	18,995	61.3%	39,329	41,472	-5.2%
Public Works and Utilities	6,208	8,040	29.5%	31,613	28,964	9.1%
Total Permit Construction (thous. of dol.) 2	37,422.9	51,876.0	38.6%	71,750.2	87,844.1	-18.3%
Residential	15,162.8	18,071.0	19.2%	34,658.9	40,501.3	-14.4%
Nonresidential	13,912.7	22,249.4	59.9%	23,366.0	33,457.4	-30.2%
Additions, Alterations, and Repairs	8,347.4	11,555.6	38.4%	13,725.3	13,885.4	-1.2%
New Dwelling Units (no.)	213	237	11.3%	477	597	-20.1%
Employment						
Civilian Labor Force (thous.)	740.0	765.3	3.4%	759.5	755.5	0.5%
Total Employed Persons	697.6	731.7	4.9%	723.3	709.2	2.0%
Unemployed Persons	42.4	33.6	-20.8%	36.2	46.3	-21.7%
Percent Total Labor Force	5.7	4.4	-22.8%	4.8	6.1	-22.3%
Employees on Nonagricultural Payrolls (thous. of jobs)	636.7	663.2	4.2%	658.7	641.4	2.7%
Manufacturing	94.5	100.4	6.2%	97.8	93.0	5.2%
Mining	8.4	7.8	7.1%	8.2	8.1	2.1%
Contract Construction	20.7	21.2	2.4%	24.4	26.4	-7.3%
Transportation, Communication, and Utilities	37.7	39.5	4.8%	39.4	37.9	3.9%
Wholesale Trade	34.2	35.7	4.4%	34.9	34.8	0.1%
Retail Trade	116.3	121.6	4.6%	120.2	118.0	1.9%
Finance, Insurance, and Real Estate	33.4	33.0	-1.2%	33.5	33.8	-0.9%
Services 3	148.6	159.2	7.1%	157.8	147.6	6.9%
Federal Government	39.4	39.4	0.0%	39.5	39.8	-0.9%
State Government 4	38.7	39.6	2.3%	38.1	38.0	0.5%
Local Government 4	64.8	65.8	1.5%	64.9	63.9	1.5%
Average Weekly Hours						
Manufacturing	39.6	39.9	0.8%	40.6	39.8	2.0%
Mining	46.2	40.1	-13.2%	41.8	41.6	0.4%
Wholesale Trade	38.3	35.3	-7.8%	37.3	38.1	-2.1%
Retail Trade	27.3	26.4	-3.3%	28.0	28.1	-0.3%
Amount of Unemployment Compensation (thous. of dol.)	7,744.3	7,877.3	1.7%	5,804.5	7,492.9	-22.5%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,101.7	2,285.3	8.7%	2,350.6	2,440.7	-3.7%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	83,700.0	138,032.4	64.9%	151,562.1	142,270.9	6.5%
Sales and Use Tax	19,219.2	41,980.1	118.4%	55,225.0	48,275.3	14.4%
Motor Fuel Tax	8,817.2	9,712.7	10.2%	10,951.0	9,422.7	16.2%
Individual Income Tax	41,038.6	63,435.0	54.6%	54,750.2	50,325.1	8.8%
Corporation Franchise Tax	2,649.9	2,547.0	-3.9%	6,646.4	7,082.6	-6.2%
Production						
Net Electric Power Utilized (mil. of kwh)	1,272.0	NA	NA	NA	1,153.5	NA
Crude Oil to Refineries (thous. of bbls.)	3,829.2	NA	NA	NA	3,780.6	NA
Crude Oil (thous. of bbls.)	2,923.7	2,511.6	-14.1%	2,722.0	2,928.3	-7.0%
Natural Gas (mil. of cu. ft.)	25,579.8	25,437.6	-0.6%	23,112.1	21,828.3	5.9%
Coal (thous. short tons)	1,613.0	1,494.0	-7.4%	1,497.1	1,327.3	12.8%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	799,229	900,976	12.7%	875,801	848,316	3.2%
Highway Traffic Count Across State Lines	NA	29,022	NA	NA	NA	NA
Transient Room Taxes (thous. of dol.)	1,400.8	228.8	-83.7%	527.2	494.5	6.6%
Visits, State, Nat'l. Parks, Monuments (thous.)	301.9	262.2	-13.2%	1,100.3	1,061.2	3.7%
Utilities						
Telephone Lines in Service (Mt. Bell)(Residential)	486,449	495,958	2.0%	489,389	480,634	1.8%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	178,159	183,595	3.1%	181,483	176,271	3.0%
Electric Customers (Residential)	478,914	484,788	1.2%	477,206	473,661	0.7%
Electric Customers (Commercial)	46,702	47,929	2.6%	46,929	46,332	1.3%
Natural Gas Customers (Residential & Commercial)	459,446	470,120	2.3%	460,140	447,791	2.8%
Natural Gas Customers (Industrial)	548	558	1.8%	550	553	-0.5%

Utah Business Statistics

UTAH DATA	Jan. 1988	Jan. 1989	% Change from Year Ago	12 Month Average This Year	12 Month Average Last Year	12-Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	50.0r	51.8f	3.6%	52.6	52.1	1.0%
Unemployment Rate	5.4r	3.8	-29.6%	4.2	5.4	-22.5%
Auth. Permit Construction (thous. of dol.)	4,139.1	4,176.8	0.9%	9,206.8	12,509.4	-26.4%
New Dwelling Units (no.)	29	33	13.8%	69	89	-22.8%
Postal Receipts (thous. of dol.)	383.2	546.6	42.6%	438.5	387.8	13.1%
Electric Customers (Residential)	48,050	49,279	2.6%	48,198	47,452	1.6%
Electric Customers (Commercial)	3,385	3,620	6.9%	3,482	3,300	5.5%
Natural Gas Customers (Residential)	50,143	51,626	3.0%	50,523	48,983	3.1%
Natural Gas Customers (Industrial)	52	54	3.8%	53	52	1.9%
Telephone Lines in Service (Mt. Bell)(Residential)	54,774	56,095	2.4%	55,457	54,829	1.1%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,897	11,653	6.9%	11,396	10,620	7.3%
Salt Lake County						
Non-Ag. Employment (thous.)	329.6r	340.3f	3.2%	340.7	333.3	2.2%
Unemployment Rate	6.0r	4.0	-33.3%	4.4	5.5	-20.5%
Auth. Permit Construction (thous. of dol.)	16,599.3	26,086.0	57.2%	30,534.9	39,963.6	-23.6%
New Dwelling Units (no.)	91	104	14.3%	179	227	-20.8%
Postal Receipts (thous. of dol.)	6,903.6	7,881.1	14.2%	8,054.7	7,363.2	9.4%
Electric Customers (Residential)	240,253	243,697	1.4%	240,025	236,720	1.4%
Electric Customers (Commercial)	20,355	20,968	3.0%	20,450	20,008	2.2%
Natural Gas Customers (Residential)	221,888	224,840	1.3%	221,115	217,535	1.6%
Natural Gas Customers (Industrial)	233	239	2.6%	237	239	-0.8%
Telephone Lines in Service (Mt. Bell)(Residential)	229,290	233,038	1.6%	230,600	227,174	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,038	111,708	1.5%	111,154	109,904	1.1%
Utah County						
Non-Ag. Employment (thous.)	77.1r	80.8f	4.8%	77.7	74.9	3.8%
Unemployment Rate	6.3r	3.8	-39.7%	4.2	6.7	-37.5%
Auth. Permit Construction (thous. of dol.)	3,728.3	11,159.6	199.3%	11,242.1	12,464.2	-9.8%
New Dwelling Units (no.)	15	24	60.0%	67	90	-25.2%
Postal Receipts (thous. of dol.)	844.4	1,217.6	44.2%	1,225.6	935.8	31.0%
Electric Customers (Residential)	51,840	53,054	2.3%	52,406	52,162	0.5%
Electric Customers (Commercial)	5,941	5,967	0.4%	5,980	6,245	-4.2%
Natural Gas Customers (Residential)	61,711	63,104	2.3%	61,871	60,381	2.5%
Natural Gas Customers (Industrial)	69	75	8.7%	69	68	0.6%
Telephone Lines in Service (Mt. Bell)(Residential)	64,566	66,271	2.6%	64,823	62,554	3.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,619	20,965	6.9%	20,273	18,911	7.2%
Weber County						
Non-Ag. Employment (thous.)	60.2r	62.3f	3.5%	61.6	60.3	2.0%
Unemployment Rate	7.9r	5.0	-36.7%	5.4	7.1	-24.0%
Auth. Permit Construction (thous. of dol.)	1,735.3	2,420.3	39.5%	5,509.2	8,258.4	-33.3%
New Dwelling Units (no.)	7	13	85.7%	46	66	-29.9%
Postal Receipts (thous. of dol.)	582.5	709.7	21.8%	682.0	608.8	12.0%
Electric Customers (Residential)	53,712	54,259	1.0%	53,568	52,904	1.3%
Electric Customers (Commercial)	4,914	5,064	3.1%	4,932	4,860	1.5%
Natural Gas Customers (Residential)	49,974	50,749	1.6%	49,879	49,070	1.6%
Natural Gas Customers (Industrial)	84	81	-3.6%	83	85	-2.0%
Telephone Lines in Service (Mt. Bell)(Residential)	46,119	46,932	1.8%	46,565	45,994	1.2%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,288	12,084	7.1%	11,942	11,092	7.7%

1 Obtained from F.W. Dodge Statistics.
2 Obtained from *Utah Construction Report*.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

NA	Not Available
r	Revised
f	Forecast

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Secretary of State.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, *Utah Agriculture*.
Construction Data	F.W. Dodge Statistics and Bureau of Economic and Business Research, *Utah Construction Report*.
Employment Data	Utah Department of Employment Security.
Savings Information	Utah Savings and Loan Institutions.
Tax Collections	Utah State Tax Commission.
Net Electric Power Utilized	Cooperating Utah Power Companies.
Crude Oil Production	Area Oil Refineries.
Natural Gas Production	Utah Department of Oil, Gas, and Mining.
Coal Production	U.S. Department of Energy.
Air Passengers	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count	Utah Department of Transportation.
Visits to State and National Parks and Monuments	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utah Utility Companies.
Postal Receipts	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

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NATIONAL DATA	Jan. 1988	Jan. 1989	% Change from Year Ago	12-Month Average This Year	12 Month Average Last Year	12-Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,724.5	5,116.8	8.3%	4,896.9	4,554.4	7.5%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,921.8	4,271.9	8.9%	4,091.3	3,803.4	7.6%
Industrial Production Indexes (seasonally adjusted) (1977=100)	134.4	141.0	4.9%	137.7	130.5	5.5%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	412.0	465.5	13.0%	434.1	391.1	11.0%
Index of Leading Indicators (1982=100)	138.7	145.9	5.2%	143.1	139.8	2.4%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	115.7	121.1	4.7%	118.7	114.0	4.1%
CPI-U (All Urban Consumers) Food & Beverages	115.7	122.0	5.4%	118.7	113.8	4.3%
CPI-U (All Urban Consumers) Housing	116.2	120.7	3.9%	118.8	114.6	3.7%
CPI-U (All Urban Consumers) Transportation	107.1	111.1	3.7%	109.1	105.8	3.1%
CPI-U (All Urban Consumers) Medical Care	134.4	143.8	7.0%	139.4	130.8	6.6%
CPI-U (All Urban Consumers) Energy	87.4	89.0	1.8%	89.4	88.9	0.6%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	106.2	111.0	4.5%	108.4	105.5	2.7%
GNP Price Deflator (1982=100) (qtly.)	119.4	125.2	4.9%	122.2	117.9	3.6%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	121.0	123.4	2.0%	121.9	120.0	1.6%
Total Civilian Employment (mil.)	114.1	116.7	2.3%	115.2	112.7	2.2%
Unemployment Rate	5.8	5.4	-6.9%	5.5	6.1	-10.6%
Construction						
Total Construction (mil. of dol.)	15,112.6	15,776.3	4.4%	20,445.9	21,258.6	-3.8%
Residential	6,739.3	7,514.7	11.5%	9,914.1	9,943.2	-0.3%
Nonresidential	5,839.7	6,081.0	4.1%	6,931.9	7,501.5	-7.6%
Non-Building	2,533.6	2,180.6	-13.9%	3,600.0	3,836.4	-6.2%
New Dwelling Units (no.)	86,614	90,829	4.9%	119,075	129,399	-8.0%
Interest Rates						
Short Term (3-month Treasury bill rate)	5.90	8.29	40.5%	6.87	5.86	17.2%
Long Term (30-year Treasury bond yields)	8.82	9.07	2.8%	9.00	8.74	3.0%
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	8.75	10.50	20.0%	9.46	8.31	13.9%
Mortgage Rates (new homes)	8.75	9.20	5.1%	8.85	8.91	-0.6%

Sources: *Business Conditions Digest,* U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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Utah's Emerging High Technology Companies

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High technology, technological change, innovation—these concepts form the core of many state economic development strategies. The objective is to create and promote new high technology companies that will in turn, provide jobs and create wealth in the local economy. It is a strategy that is well-founded. Historically, technological changes that result in new innovation are the catalysts in economic growth. Moreover, aging industrial structures (i.e., low tech manufacturing industries, iron, steel and shipbuilding) are poor "seedbeds" for new firm formation.

There is a growing body of evidence that suggests the new technology industries also provide fertile environments that foster rapid growth. High technology firms have a larger economic impact on the local economy because they tend to display spatially diverse input and output linkages. In essence, new technologies may well compensate for declines in industries once considered staples of regional economies.[1]

In theory, fostering technology is a commendable approach to economic development; however, implementation is complicated. Many factors affecting new company formation in general, and the formation of high tech companies in particular, are beyond the scope of public policy. High technology embodies an entrepreneurial spirit that supercedes the legislative process. Certain concentrations of activity (referred to as agglomeration) are necessary to achieve a vital level of economic benefit. (This occurs when one or more companies have become successful enough to form a nucleus about which other companies can spring.) Again, development of an agglomeration generally occurs despite public policy rather than as the result of public policy.

Even so, many questions must be answered before a conclusion can be made. What determines whether a company will be successful? Why does one company flourish and another fail when both have innovative products? What, if anything, can state agencies do to increase a company's chances of succeeding? This study makes no pretense of providing definitive answers. Rather, it seeks to educate policymakers as to the challenges facing young companies, with the hope that this information will be beneficial in designing and implementing policies that encourage technology development.

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[1] Ray Oakey, *High Technology Small Firms: Regional Development in Britain and the United States*, St. Martins Press, New York (1984) pp. 4-20.

A Case Study Approach

To understand more completely the problems faced by small, emerging firms, a case study has been completed for each of 10 Utah-based, high technology companies. The progress of each company will be evaluated annually. The objective is to understand the development process of high tech companies (including the innovation process) and how such companies overcome financing, management and marketing hurdles. A case study of each company has been included in this article.

The selected companies met two criteria. At the end of calendar year 1987 the company had to (1) employ fewer than 50 people, and (2) have sales or revenues less than $3 million annually. The founder or president or both) of each company was interviewed and asked to briefly outline the company's history; to identify the source of both initial funding and follow-on financing; to describe the company's product and management team; and finally, to provide an executive opinion detailing the advantages and limitations of operating a business in Utah. This report reflects the interpretations of those interviews.

The age of the companies (measured by the founding date) ranged from four years to 10 years. Company size (measured by the employment level at the end of calendar year 1987) ranged from six to 40 employees. Sales for the same time period ranged from zero to $2.8 million. Exhibit 1 identifies the companies and their specific characteristics.

The technologies under development at these companies vary dramatically; however, they all share at least one similarity, that is, the products are "high technology" or science-based and have been developed from new innovations and inventions generated by scientific activity. Even those companies developing second and third generation products are still heavily involved in the R&D process.

The 10 profiled firms are in various stages of the product development process. A few have more than one product on the market. Some are in the process of developing a second generation product. Others are still at the R&D stage.

Exhibit 1.
Characteristics of Fledgling Companies

Company	Year Founded	Research Sector	Employment 1987	Sales 1987	Source of Initial Financing
Anesta Corporation	1985	Pharmaceuticals	6	$ 59,000	Founders
Bonneville Scientific, Inc.	1981	Robotics	10	620,000	SBIR Phase I
Bunnell, Inc.	1980	Medical Equipment	11	440,000	UIC*
Capital Solutions, Inc.	1985	Software	12	732,000	Founder
CardioPulmonics, Inc.	1985	Medical Equipment	12	0	SBIR Phase I
Clyde, Inc.	1981	Software	40	2,200,000	Founder
Globesat, Inc.	1984	Satellites	15	200,000	R&D Partnership
Hart Scientific, Inc.	1979	Measuring Devices	35	2,500,000	Founders
Megahertz	1985	Computer Peripherals	14	2,800,000	Founders
TheraTech	1985	Pharmaceuticals	23	1,200,000	Founders

* Utah Innovation Center.
Source: Bureau of Economic and Business Research, University of Utah, 1989.

Unfortunately, even the most promising companies will not escape the law of averages. It is extremely difficult for a small company to become a large, successful one—a phenomenon that has been aptly described as "a natural consequence of external conditions." Scarce resources (typically capital and management), small market niches, and trying to sustain the original sense of entrepreneurship, have all been identified as culprits. One company has already ceased operations. Capital Solutions, founded by Mike St. Claire in 1986, closed its doors in July 1988. Of those remaining, only one or two will become Utah's next success stories. A handful will survive, but only as small companies.

Regardless of their future success, all exemplify what can be done. Their problems are similar to those encountered by many young, high tech firms. Small, emerging companies were selected with the hope that their experiences might help others make it over the hurdles and rise to the top.

The Founders

Over time, the level of success achieved by a company is closely tied to the level of business acumen of the founder or president. High tech imposes yet another requirement—technical ability. The importance of this technical component cannot be understated. In high tech, the technical barriers to entry are much higher than in traditional manufacturing sectors. Therefore, at least in the beginning, these companies need a leader with highly technical skills; management ability is of lesser importance. And though some entrepreneurs have a combination of technical ability and business acumen, they generally lack the latter to a higher degree; a concept that is borne out in this study.

Six companies (Bonneville, Bunnell, Clyde, Globesat, Hart Scientific, and TheraTech) were founded by technical entrepreneurs (individuals with backgrounds in engineering, science, or medicine) with little or no business experience. In only four of these six cases is the original founder still involved in daily management activities. The two founders of Hart Scientific replaced themselves with an experienced business entrepreneur, and now hold executive positions more suited to their skills. The founders of Bunnell (Dr. Bert Bunnell), Globesat (Dr. Rex Megill), TheraTech (Drs. Kim, Higuchi, and Patel), and Bonneville (Alan Grahn and Lynn Astle) have acquired management skills as their companies have grown. The founder of Clyde (Alan Clyde) has left the company completely.

Three of the companies included in this study (CardioPulmonics, Anesta Corp., and Megahertz) were co-founded by both a technical entrepreneur and a business entrepreneur. Capital Solutions was founded by an individual with both technical and business experience.

"Why?"

"Why did you start your own business?" Each entrepreneur had a different explanation, but the motivations were similar. A common notion is that financial reward is the prime motivation in the creation of a new company. Certainly, the prospect of financial gain played an important role; in fact most entrepreneurs indicated it was indeed one incentive. However, when the given reasons were prioritized, the potential for reaping great financial rewards ranked last.

Solving a problem or filling an existing niche were the driving forces for most of these entrepreneurs. In every instance, the creative, technical, or scientific expertise of the founder was challenged; this challenge provided the impetus needed to form a company. Each entrepreneur expressed the importance of making a contribution to his respective industry as yet another incentive. Some philosophical motivations were expressed. One entrepreneur indicated that the motivation behind forming his company came, when as a senior at the University of Utah, he was diagnosed with cancer. During his stay in the hospital, he decided to make medicine his career, and ultimately design equipment to help other patients. His product, a Life Pulse High Frequency Ventilator, assists the respiration of critically-ill infants.

Having the independence to pursue a specific interest was another often repeated sentiment. These founders wanted to develop and implement their own ideas and innovations which, in many cases, were in direct opposition to the goals of their organizations. The thrust was not so much the wanting to be one's own boss as it was to follow a particular interest. This is the very reason that Hart Scientific was founded. The founders (Hart and Hurst) jointly developed an instrument that their employer was not interested in manufacturing. As a result, they left and formed their own firm.

"It's My Business"

"It's my business" is the motto of most entrepreneurs. A hands-on style of management, coupled with a strong sense of commitment to the organization usually means the entrepreneurial manager will be involved with every detail of the company. He reserves the right to directly influence any decisions that are of importance or interest to him regardless of the organizational level of such decisions. When a firm is in the early start-up stage, this type of commitment may be both a necessity and a plus. However, as the company grows, this practice may quickly become counterproductive as the daily management requirements exceed the business acumen of the entrepreneur, and he fails (or is unable) to delegate responsibility to others.

In a newly established high tech company, an innovative product commands high prices resulting in high margins masking management inefficiencies. As the company's market grows, more demands are placed on the entrepreneur. Those who can develop the necessary business skills will likely be more successful. Unfortunately, not all entrepreneurs are willing to admit that they lack expertise in this area. This was the case of Alan Clyde (founder of Clyde Digital, predecessor of Clyde, Inc.).

Clyde's sales initally skyrocketed because Alan Clyde's technical insights were years ahead of the competition. After this initial growth the company performed poorly, and Clyde looked for and found outside financing. After several months, the new directors approached Clyde and suggested that he delegate more of his managerial responsibilities to others. In the long run, he was unable to do this effectively and eventually left the company.

This is an extreme case; however, many of the entrepreneurs admitted that their companies have suffered from their lack of management skills and inability to delegate effectively. Although each has the technical capability and determination necessary to launch a company, once it becomes a going concern the lack of experience and training makes for a constant struggle. Most of the founders were very candid as to their managerial skills or lack thereof. In several instances, they readily admitted their companies were headed for failure until professional management was recruited; and they concentrated entirely upon the technical end of the business. As several founders indicated, the issue is not whether they can or cannot manage a company. Given enough time, most could acquire the needed skills. The key component is time. Most entrepreneurs do not have time to struggle through the management issues when "more important issues are at hand."

"Today Not Tomorrow"

Start-up companies are struggling to survive. This sense of living day-to-day typically results in the entrepreneur-manager developing a short-term perspective that excludes any long-term planning and fosters a reactive approach to problem solving. Furthermore, the reactive manager spends an inordinate amount of time putting out "fires". The daily problems become all-consuming while the company's growth screeches to a halt. Indeed, this has been the case for several of these fledgling companies. Founders of these companies told of their recurring "dark hours" when all seemed lost. One person recounted a bleak period when he did not answer his telephone or open the office because he was afraid of being inundated by bill collectors.

Under such pressures, postponing long-range planning may seem justifiable but, by not planning, the entrepreneur often leads his company into even more severe situations. At least half the emerging companies highlighted in this study did not have a formal business plan. Although every entrepreneur talked at length about the short-term future of the company; the next big sale or the level of employment the company expected to reach within the next two to three months; very few were able to talk about the company's long-term future, and even fewer had business plans that provided a multi-year projection of financial performance. Without a plan, it is difficult to attract investment capital, establish effective banking relationships, allocate resources for new product development, and integrate existing research with product development.

Finance

Perhaps one of the most challenging hurdles faced by young high tech companies is that of locating investment capital. As start-up or first stage enterprises, these companies do not have internally-generated reserves to offset hefty development costs. Moreover, without a track record or asset base, it is difficult to borrow funds. Contrary to popular belief, neither venture capital or bank financing play a significant role in the formation of high tech companies. Most start-ups rely on the savings of the founder for the initial injection of capital. In light of this, it is not surprising that the sole source of start-up capital in more than half of the survey firms came from the founders, their families, or friends.

Some firms have combined founder's capital with money from state or federal programs. Two companies were founded using research monies obtained through the Small Business Innovation Research (SBIR) program. Another company was "incubated" at the Utah Innovation Center, and yet another used an R&D partnership to raise capital.

Follow-on financing is another matter. It is clear from the interviews that the initial investment is quickly spent. To survive, every entrepreneur had to locate a new source of capital. The sources used included venture capital investments, private placements, research grants, cash flow financing and mergers.

Venture Capital

While it is true that venture capital is not a significant source of start-up financing, it plays an extremely important function at the margin in providing the entrepreneur with a secure source of capital. Venture capital also acts as a lead investor in attracting capital for future needs. For example, it is in the best interest of a venture investor to select and finance only those companies most likely to succeed. Once chosen, it is much easier for these companies to obtain additional financing from other sources, namely institutional funds, and to a lesser degree, banks. Venture capitalists also provide a certain degree of managerial expertise (although this varies widely from fund to fund) which in turn may help the young firm grow faster.

The drawback of venture capital is obvious. Because equity is generally traded for this capital infusion, the risk that the entrepreneur may lose internal control of the organization always exists.

In the most extreme case, the entrepreneur may be forced out of the organization completely.

Several of the study firms have been successful in attracting investment dollars from venture capital funds. CardioPulmonics is a notable example of a firm that has been able to tap this capital source despite the fact it has no marketable product at the present time. Since its inception in 1984, CardioPulmonics has received three separate rounds of venture financing totaling more than $2 million, and is now raising a much larger fourth round. The president expects to raise an additional $5 million in venture money before the product is marketed.

Securing such capital is the result of a carefully planned strategy, and is an important lesson for other aspiring entrepreneurs. Venture capitalists are attracted to companies for many reasons. The ones identified most often include: (1) an experienced management team; (2) a product with the potential to reap extraordinary profits; and (3) a sound, realistic business plan.

Cardiopulmonics met all three requirements. One of the company's founders is an experienced entrepreneur with a strong business background; the other is a noted surgeon with experience in medical equipment research and development.

High tech firms have a better chance of attracting venture money when the effort is spearheaded by an experienced entrepreneur. Capable management is such an important ingredient for success that venture investors rank it ahead of a product's market potential. Investors have learned through experience that a company with a solid management team, and perhaps only a slightly better product stands a better chance of success than a company with a superior product but inexperienced management.

Several founders acknowledged that they were unable to move beyond the research stage until an experienced business person or entrepreneur joined the company. Generally, an experienced entrepreneur is familiar with the requirements demanded by venture capitalists, and may even have personal contacts with equity investors. The chances of raising capital using such contacts are much greater than those of the inexperienced technical founder.

Although venture capital is a solution, it is not the right one for every emerging company. A few entrepreneurs refused to use venture money as a remedy for their capital gap. The founders of Megahertz, for example felt that the price, in terms of lost equity and potential loss of managerial control, was simply too great for what the company would receive in return. If venture capital is not the solution for every company, what other outside investments are possible? A private placement was a method used by one of the survey firms.

Private Placements

Private placements range from sophisticated financing programs to informal loans between friends. It is simply the exchange of money for some type of consideration—generally common or preferred stock or warrants. Private placements are popular with entrepreneurs because there is little, if any, dilution of the founder's managerial control. Also, the legal issues and reporting requirements are more flexible than is the case in public offerings. However, private placements have drawbacks as well. The very flexibility that makes these transactions appealing can lead to problems. For example, the founder of one emerging firm indicated that he had structured his private placement in such an unusual way that it was impossible to attract other investors at later stages. He had in effect, closed the door on many second stage financing options.

Research Grants

Even with an experienced management team and formal business plan, some companies are simply not candidates for venture money. Perhaps the product's market is too small, or the investor and the entrepreneur cannot agree on an acceptable level of equity participation. These companies face the same product development costs and marketing hurdles as companies that are candidates for venture capital.

One source that has been used successfully by Utah companies is the Small Business Innovation Research program (SBIR) administered by the federal government. The SBIR program began in 1982 and requires that federal agencies with R&D budgets exceeding $100 million establish a program to help small firms compete for federal contracts.

This program provided the initial funding for two of the survey firms—Bonneville Scientific and CardioPulmonics. Bonneville Scientific has been awarded 16 SBIR grants totaling $1.87 million since its inception in 1981 (about 16 percent of all awards made to Utah firms). The firm has also been successful in converting Phase I grants into the more lucrative and commercially promising Phase II grants. In addition to federal funding, Bonneville has also received a state grant that has allowed the company to continue its research.

Not all companies have the technical capacity to be as successful as Bonneville in securing government research grants. Moreover, there are cash flow problems associated with such programs. For example, federal agencies can be slow in paying their bills, thus creating tremendous cash flow pressures for small companies. However, if a company has the technical expertise, and the need to support R&D on a prolonged basis, government-sponsored research programs are one solution.

Cash Flow Financing

Financing growth through operations is perhaps the desired method by most entrepreneurs (and the most difficult to sustain). One emerging company has used this particular method effectively.

In 1985, Megahertz Corporation introduced the turboswitch (a peripheral that boosts the response time or speed of a personal computer). Garnering over $1.5 million in sales, it was an immediate success, and resulted in substantial profits for the company. Second and third generation products have been developed and marketed. It is not surprising that after several lucrative years, the company has been approached by venture investors, but according to Spencer Kirk, the company's president, "the price of venture investment is far too high." The management team decided not to relinquish their equity and chose instead to grow at a slower rate.

Megahertz is in an enviable position as it did not have to rely on outside investments. This is a rarity. Funding growth through cash flow requires two things—a high growth market and a product fit to that market. The turboswitch was the right product for the right market at the right time. Furthermore, market growth carried the second and third generation products. Few firms enjoy such good fortune. In fact, with the exception of Hart Scientific, not one other company could effectively use cash flow to finance even R&D operations.

Mergers

The term mergers, as used here, is a catch-all category that includes joint ventures, the formal merging of two or more companies into one entity, and finally the equity investment, exchange or acquisition of one company by another. Each of these strategies has been used by one or more of the survey companies. TheraTech, Inc (TTI) and Globesat have both used this strategy.

Founded just three years ago, TTI is a rapidly growing, high technology company. Since 1985, the company has increased its employment base to 23 people, and conducts over $1 million each year in R&D. Though TTI was initially financed by the founders, hefty R&D expenditures precluded them as a permanent source of financing. TTI's solution was to align itself with larger companies using research and development partnerships which would allow TTI to further develop its innovative drug delivery system.

Globesat also pursued a merger strategy in a different way and for different reasons. Rather than merge with a larger corporation, Globesat acquired a smaller firm. In the classic sense of a merger, only one company remained. The motivation behind the merger was to link up with a cash flow company which also served as a manufacturing outlet for Globesat's products. As the CEO declared "the other company acted as our venture capitalist."

Again, not all companies can make use of a merger strategy. TTI has capitalized on the technical expertise of the founders, who are well respected within the medical and pharmaceutical industries. Many large organizations in either industry would readily purchase TTI. However, at the present time, the founders want to remain independent and pharmaceutical and medical companies must be satisfied with a joint venture arrangement.

Other Issues

Aside from financial and managerial concerns, high tech companies must deal with a variety of other issues; namely, research and development concerns, marketing, and regulatory hurdles.

Research and Development

Every company in this study conducts research and development on a daily basis. In almost every case, the success of the company ultimately depends upon the success of these efforts. R&D is an expensive endeavor and usually occurs in periods prior to the manufacture and sale of the company's product. Furthermore, a great misconception of high tech entrepreneurs is that R&D efforts always result in successful innovation. This is not always the case; so the entrepreneur does not know what the payoff will be if the company incurs hefty R&D expenditures. This is a double-edged sword. If the company is unable to obtain adequate financing to continue with its R&D efforts, it may be forced to undertake new product development on a much smaller scale. While this approach eliminates the capital problem, it rarely yields the large profits associated with radical leaps forward at the leading edge of product technology. Exacerbating this situation is the product development cycle of high tech products.

New product develpment must be a continual activity in the high tech company. Typically, a high tech company is established to develop one product. Unfortunately, this product usually has a relatively short life cycle; a situation that has not been anticipated by the founder. This highlights a common problem; development of a second or third generation product. Such development is time consuming and costly. The challenge is to find the level of R&D activity that fits with the company's financial constraints. Most importantly, R&D is not a one-time expenditure. On the contrary, it is an ongoing function of the high tech company. Furthermore, it is rarely as inexpensive or as easy to finish as initially planned. Delays and setbacks are inevitable.

Marketing

One component often overlooked by high tech entrepreneurs is marketing. The entrepreneurs interviewed for this study were no exception. Many commented that marketing lagged far behind the technical development of the product or process. Some were unable to readily identify their target market, or the product's market potential. Others felt that "everyone can use this product."

When marketing is not included in the planning process, it is usually ignored until problems surface. And since marketing functions are almost always foreign to the technical founder, the tendency is to rely on the product's technical prowess as the selling tool. A comment heard more than once was, "with this new product, people will be breaking down our doors." This rarely happens. A well-conceived marketing strategy that leads to a properly targeted and executed launch must be an integral part of the innovation process.

Integrating marketing considerations with technological development is one way to avoid this pitfall. When the innovation reaches a certain stage, both the technical feasibility and the marketing feasibility should be evaluated before the product moves to the next developmental stage. In other words, the innovation must travel two paths. After all, the final test is the willingness of consumers to purchase the product.

High tech companies struggle with the marketing issue for a variety of reasons. In a nutshell, these companies lack those competitive advantages that are at the core of successful marketing programs. For example, small companies do not have the solid, technical reputations on which to draw when marketing a product. They lack a complete product family or a trained technical sales force, or both. Few have follow-on products and after the initial success of a first generation product they simply disappear (or start over from scratch).

Choosing the Right Horse for the Right Race

Choosing the market best suited for a specific product is yet another challenge in developing an effective marketing plan. A strategy that has been tried by two emerging companies is the "market niche" approach. The market niche concept (also referred to as market segment strategy) is simple. A niche or segment market consists of a group of customers who share common needs and exhibit similar buying patterns. The market is segmented by product characteristics (highly technical equipment, for example) and capacity requirements (one-of-a-kind items). Both Hart Scientific and Capital Solutions tried this method with varying degrees of success.

Hart Scientific manufactures and markets highly specialized measuring instruments that are used by large corporations and research universities. As a rule, Hart's customers will require only one or two of these precise instruments. However, the product is expensive and the margins are high. So, although the market is small, the company still realizes a handsome profit.

Capital Solutions is another emerging company that tried this marketing strategy with less desirable results. Capital Solutions developed and sold inventory accounting software designed specifically for the auto glass industry. For this company, the niche strategy did not work for several reasons. First, the niche was too small. Second, it was not a growing segment of the software industry. Third, the product did not command high enough margins to compensate for the lack of sales volume. Finally, the company was competing for market share with more established companies.

Regulatory Requirements

Regulatory requirements are not an issue for all high tech companies, but for those governed by such restrictions, getting a product to market can be a nightmare. The federal program most criticized by executives in this study was the Food and Drug Administration (FDA). Anecdotes describing problems in dealing with FDA reviewers were recounted time after time by entrepreneurs who are developing medical or pharmaceutical products.

FDA has such stringent testing requirements, that the time between prototype development and the manufacture and marketing of a product can be extremely long (in some cases years). The dilemmas faced by such high tech companies are exemplified by the story of Bunnell, Inc.

Like most high tech companies developing medical products, Bunnell needed FDA approval before the marketing of the company's Life Pulse High Frequency Ventilator could begin. Though most of the research for the ventilator had been completed prior to the company's formation, an additional four years of research and testing was required to satisfy FDA reviewers. According to Dr.

Bert Bunnell, president of Bunnell, Inc., the FDA reviewers did not understand the technology of the ventilator or its uses. A complicating factor was the high turnover rate at the agency. Just as one reviewer gained a technical perspective of the product, he or she would leave and the educational process would begin all over again. Dr. Bunnell eventually received approval for his product, but not before his company had incurred incredible costs.

Other high tech companies that specialize in medical or medically-related products should evaluate the perils of running a business while trying to secure FDA approval. In retrospect, Dr. Bunnell offers some tips for survival:

> *First, do not try shortcuts. Follow the rules as FDA will not make exceptions nor will the reviewers cut corners. Second, limit the scope of the application. The more complicated or foreign the innovation, the longer it will take to be approved. Third, develop a support system within the medical community, and if possible, find a champion within the FDA who is willing to guide the application through the regulatory maze. Finally, be prepared for a long battle and remember consistency, not speed, wins in the end.*

Why Utah?

Research shows that small firms are typically established in the area of the founder's home. Without exception, each entrepreneur indicated that this was the primary reason for basing the company in Utah, although they were quick to point out that the state offers other advantages. One advantage is the proximity to and interaction with universities located in Utah; namely, University of Utah, Utah State University and Brigham Young University. At least half of the founders came from university environments (several still maintain university faculty positions).

Another advantage is Utah's labor force. Not only is there a ready pool of technical workers, but those workers exhibit a strong commitment to their employer. For an emerging firm, this level of skill and loyalty is crucial. When a small company faces financial crisis, it is often the workers who sacrifice current pay for future opportunities. This was the case with Capital Solutions. Under extreme financial pressure, the employees opted to continue working even though the company was unable to meet its payroll.

A common remark made by this group of executives is that Utah offers the best of all situations—a lifestyle that is compatible with high tech development but free from the problems presently plaguing other high tech areas. In addition to the state's research facilities, entrepreneurs in Utah enjoy cultural and recreational opportunities, a solid educational system, and an affordable lifestyle. For example, Bill Moeller (founder of Anesta Corp.) came to Utah with some skepticism. However, when he left the employer which brought him to Utah, he decided to start a company in the state because of the advantages.

Utah also has limitations as many entrepreneurs pointed out. The limitation voiced most often was the reluctance of the banking community to lend money to high technology companies. In defense of the banking community, most entrepreneurs think their innovations are valuable. This is not always the case. Bankers, in their endeavor to keep the level of poor investments at a minimum, may also overlook the needs of viable organizations. A prime example of this attitude was offered by the President of Hart Scientific.

As Mr. Hart explains, the founders had completed a contract for the federal government and needed a line of credit for cash flow. They were willing to use the contract for collateral. But, in their opinion, because the request did not involve a real estate transaction or automobile purchase, they were refused. Instead they had to factor their accounts receivable at fifty cents on the dollar in order to continue business operations.

The lack of risk capital is another often-mentioned limitation. While Utah does have a venture capital market, it is small. A few entrepreneurs have been able to take advantage of this market, but indicated it could only fill the company's capital gap for a limited time. To obtain the large sums of money needed for extensive R&D, the founders looked for investors outside the state.

Two founders felt that although the work force is productive and loyal, it lacks that entrepreneurial spirit found in other established high tech centers. They were of the opinion that this spirit is really the essence of a high tech company, and without it the chances of becoming a true success story are reduced.

Conclusion

In discussing the challenges faced by these small firms, one issue is clear. The needs of high technology companies are very different than those of traditional manufacturing companies. First, high technology is extremely research-oriented and its markets are technology-driven. R&D expenditures are high and usually occur in periods prior to the manufacture and sale of the product. Furthermore, R&D efforts do not always result in a successful innovation. Second, life cycles of high tech products are short, resulting in a profit structure that is not uniform and that detracts from the overall security of the company. This poses a major problem when capital is needed for second or third generation product development. Finally, in many cases, high tech companies are founded by technical entrepreneurs who are unfamiliar with management and marketing issues.

With so many hurdles, it might seem impossible for public policy makers to design and implement programs that benefit or foster technological development. And, in fact, public policy decisions are only effective in certain areas and to varying degrees. For example, the effectiveness of policy implementation that will ameliorate the financial constraints discussed above is still being debated.

On one hand, a state can design and implement financial programs to help fledgling firms. Government incentives may take the form of grants or low interest loans. However, few states have unlimited financial resources. In the end, state agencies, as prudent investors, would either use the same criteria required by venture capital investors or by the financial community in making financial determinations, or they would become a "bank of last resort", investing in companies that other financial institutions have turned away.

Even in those regions where financial considerations are less pressing, establishing such a program does not solve the problem. The banking community is still not involved in the process—an important consideration when one considers the role played by the financial community in fostering high tech in Silicon Valley and Route 128.

Another limitation that clearly falls outside the public arena is the technical founders' lack of business acumen. In the broad sense, it is not the state's job to decide who is eligible to manage or to establish a company, though state-funded agencies can make management teams jump through hoops when state-funded financial assistance is provided.

In spite of these limitations, there are methods by which states can encourage the creation and expansion of technology-oriented enterprises. Maintaining a favorable legislative climate is a prime example of effective public policy. For instance, universities and high tech companies are major spawning grounds for high tech start-ups. More than half of the firms profiled in this stduy are spin-offs from a university or high tech company. In some cases, these companies were established because former employers had no interest in developing the specific innovation or invention.

Legislation that hampers or discourages such spin-offs will eventually defeat economic development efforts as the entrepreneur either abandons his dream completely or locates the company in an area where new firm creation is encouraged.

The state can also play an integral role in fostering high tech development by maintaining a strong commitment to education. While a solid educational system, especially higher education, is beneficial to all businesses, it is imperative to the high tech development.

The relationship between universities and high tech agglomeration can be found throughout the U.S. Silicon Valley in California is anchored by Stanford and Berkeley. Route 128 in Massachusetts is fed by Harvard, MIT, and other local colleges. The Golden Triangle of North Carolina takes advantage of the benefits offered by Duke University, North Carolina State and the University of North Carolina. Given these examples, it is clear that education plays an important role in the expansion of high tech industries.

In summary, it remains to be seen which of these emerging firms will triumph. Of the nine remaining companies, perhaps all will continue along the road to success. A great deal will depend on the abilities of the respective management teams to overcome the challenges that lie ahead.

MAY/ JUNE 1989

Anesta Corp.

Background

Anesta Corp. was formed in August 1985 as a result of the early clinical promise and potential of a new anesthetic drug delivery system called Oral Transmucosal Fentanyl Citrate (OTFC). Dr. Theodore Stanley, a prominent anesthesiologist and researcher, is a founder of the company and along with Brian Hague, R.Ph. invented this new non-invasive dosage system. William C. Moeller is also a founder of Anesta, and is currently acting as President and Chief Executive Officer (CEO). Dr. Stanley and Mr. Hague developed the product at the College of Medicine at the University of Utah, as a spin-off of their research efforts. The patent for OTFC is in the University's name; however, Anesta has an exclusive license to further develop and commercialize the product, and plans to develop a range of other pharmaceuticals that can be administered in oral transmucosal (OT) dosage form.

Product

OTFC is a new non-invasive dosage form of the synthetic opiod fentanyl, a potent analgesic, sedative, amnestic and anesthetic. OTFC is currently being used in pre-medication prior to surgery and for analgesia and sedation in pediatric patients undergoing painful diagnostic procedures under an Investigational New Drug Exemption (IND). Other potential applications include use in the emergency room for urgent care or in the treatment of chronic pain in situations where the patient might experience recurring episodes of intense breakthrough pain.

Dr. Stanley developed OTFC during the time he was a professor of Anesthesiology and Surgical Research at the University of Utah, School of Medicine. The origin of this innovative drug delivery system is unusual and illustrates the innovative process. While as a consultant to the University of California at Davis in 1985, Dr. Stanley was asked to help administer a drug to several primates at the University's research center. Hoping to avoid a risky confrontation when the drug was administered, he disguised it in a sugar cube. The plan worked. The primates were sedated with very little discomfort and minimal risk to the research team. This success triggered Dr. Stanley's imagination, and upon returning to Utah, he developed this new method of administering analgesic and sedative drugs to children using the mucosa as the route of delivery.

The OTFC anesthetic dosage form is a candy matrix incorporating fentanyl mounted on a handle or stick. In concept it is similar to a lollipop but does not look like a lollipop. During insertion into the patient's mouth, the patient is instructed to suck vigorously. The drug is absorbed directly into the bloodstream through the mucosal tissues of the mouth, pharynx and esophagus. Appropriate monitoring of the patient's reaction to the drug indicates when it has evoked a suitable response; that is, the patient becomes sleepy or experiences less pain. OTFC can be removed entirely and the amount of drug absorption decreased during administration depending on the clinician's assessment of the patient's response.

OTFC offers several unique advantages over more conventional delivery systems: (1) ease of administration; (2) greater control of effective dosage; (3) safety; and (4) cost effectiveness. Unlike oral digestion or injections where relatively large doses are given intermittently, OTFC is administered in a continuous dosage and administration can be regulated according to the patient's response. Some patients have difficulty swallowing pills or capsules. By using OTFC, medicine can be taken orally without the discomfort of injections.

OTFC can be easily removed, something that is impossible when using nonreversible methods (such as oral administration of pills, capsules or solutions) and difficult with IV and IM injections. When used as an analgesic, the physician or nurse allows the patient to control his own pain relief through self administration of small amounts of the drug by sucking harder or removing OTFC when the desired effect has been achieved. Furthermore, OTFC avoids the adverse effects from the trauma of injections. Moreover, a "dose-to-effect" administration provides a margin of safety in a clinical situation compared to the calculation of IV or IM drug dosage where individual drug tolerance is unknown. OTFC can increase the safety of general anesthesia when used as a premedication by blocking the body's natural stress response, thereby improving hemodynamic balance. Finally, OTFC is a simple, inexpensive and convenient drug delivery system. It eliminates the need for syringes, needles, and drug vials.

Currently, OTFC is being tested in 11 clinical studies at nine respected medical institutions. Four of these studies have been completed. It is anticipated that all reports and tests will be completed and submitted to the Federal Drug Administration (FDA) by the end of 1990. Final approval for the product is expected in 1991 or 1992.

Funding

Facing a prolonged period of testing before OTFC can be marketed, the founders of Anesta have had to rely on a variety of financial sources. Like many other high tech firms in Utah the initial capital contribution came from the founders, Dr. Stanley and Mr. Moeller. Additionally, the company has been extremely successful in attracting venture dollars. Soon after the initial capital contribution, Mr. Moeller prepared a business plan to solicit other investors. His experience in developing small high tech companies was helpful in attracting venture investors.

The company has financed its development in stages. Morgan, Holland Ventures Corporation in Boston, Massachusetts became the lead venture capital investor in 1986. Subsequent financings included other venture capital firms including Utah Ventures, a Utah-based venture capital fund, other institutional investors and some of the individual shareholders of the company. In total, $1.5 million has been invested in the company through March 31, 1989.

Like many other medically-oriented companies, Anesta has relied on the venture capital market as a source of investment capital for a number of reasons. First, the product requires a lengthy testing period for FDA (in this case four years). During this period, the company will have no income or revenues (other than investments) to offset the development costs and expenses. Also, the company has no track record or asset base to make it eligible for debt financing. Second, the venture is risky. Although preliminary tests for OTFC are promising, until the system is approved, manufactured, and marketed, the future is uncertain. The risk is very high and usually only venture investors are willing to participate. Finally, as a start-up company, Anesta lacks management resources. Venture investors add value to the company by advising the company on strategic issues.

Anesta is attempting to strike a joint venture agreement with pharmaceutical companies. This alliance strategy is a common one for firms like Anesta that are involved in medical or pharmaceutical products. Often, the time between the innovation and its commercialization is so long, that a small company must align itself with a larger company even if it has backing from venture investors. A large company can provide equity dollars as well as assist in the marketing, production and distribution of the product. For its part, the larger company may benefit from the innovation itself, or from the R&D that is undertaken by the small firm. Further, merging with a smaller company is an easy way to enter a niche market.

Market Potential

To attract venture investments, a company's innovation or product must offer extraordinary market potential. Anesta expects to enjoy 100 percent of its market because of its proprietary patents. This market share could result in annual sales of over $100 million for OTFC. As other drugs are converted to this delivery system, the market potential expands exponentially. Potential application of the OT dosage form includes other pharmaceuticals such as drugs for treating cardiovascular problems, cancer, asthma, diabetes, and infectious diseases.

Management and Employment

William Moeller is the President and CEO of Anesta. He is also a founder of the company. He has held senior management positions with several medical companies and has 12 years of experience in the field of anesthesia. As the CEO, he is responsible for the management of the company, and works closely with venture investors and the Board of Directors. His role is a combination of entrepreneur and executive.

Dr. Stanley is a founder and Chairman of both the Board of Directors and of Anesta's Scientific and Medical Advisory Board. He is internationally known for his work in the clinical testing of intravenous, anesthetic drugs and has been a consultant to numerous companies in the investigation of new drugs. He devotes part of his time to company affairs directing the research and clinical testing efforts.

In addition to the CEO, there are eight other full-time employees. The company employs two people on a part-time basis. Including Dr. Stanley, seven employees are involved in R&D. There is virtually no employee turnover. With such a small staff, the company has not had problems finding qualified personnel and researchers.

Utah: An Executive Opinion

According to Anesta's founders, the relationship with the University of Utah is the most important advantage of doing business in the state. The company has a close working affiliation with the University's School of Medicine, thus providing an expeditious way of rapidly conducting the initial screening and testing of a wide range of drugs. Further, the level of activity in biomedical device development at the University of Utah, and the extensive experience and contacts of the founders and members of the company's Scientific and Medical Advisory Board, place Anesta in a favorable position to identify and assimilate other emerging technologies that fit within the company's strategy.

Although the company has had a rewarding relationship with the University, as it looks to the future there are a few dark clouds. In the view of some Utah out-of-state investors, Utah is not perceived as a desirable location to build an integrated pharmaceutical company. It may be a great place to capitalize on the research and development infrastructure and start a company, but there is an image problem.

Executive recruiters tell venture capitalists that first-rate executives are reticent to locate in Utah because of negative perceptions about the state. This reticence results in a management gap which in turn exacerbates the state's capital gap. It is a reinforcing cycle. However, Anesta's executives believe the negative impressions held by non-Utahns are more imaginary than real. The CEO of the company, for example, moved to Utah several years ago. He enjoys the quality of life found in the state and has not had any problem fitting in. Nevertheless, he admits the perceptions persist and may slow high technology development in Utah.

Bunnell Incorporated

Background

Bunnell Incorporated has overcome almost every conceivable hurdle that emerging companies may ever have to face. The company was formally founded in 1980 by Dr. Bert Bunnell to commercialize the Life Pulse High Frequency Ventilator, a new device for assisting the breathing of critically-ill newborn infants. The research efforts which initiated the ventilator's development began in 1972, while Dr. Bunnell was a Research Fellow and Associate in Pediatrics at Massachusetts General Hospital and the Harvard School of Medicine. Over the years, Bunnell has suffered a myriad of setbacks including a heated battle with the federal Food and Drug Administration (FDA). However, the company's prospects skyrocketed when it finally received FDA approval for its high frequency ventilator in June 1988.

Many of the problems between the company and the FDA were due to unique differences between Bunnell's product and currently used conventional ventilators. The latter depend on relatively high pressures which can cause fatal complications such as bursting the fragile air sacs of an infant's lungs and straining the infant's heart. Blood pressure is elevated due to this strain and brain hemorrhaging frequently follows. The Life Pulse High Frequency Ventilator corrects this fault by delivering oxygen using low pressure jets of oxygen-rich air delivered at rates as high as 11 breaths per second.

The major criticism of Bunnell's FDA application was the lack of a control group for comparison with treated patients. Dr. Bunnell and his physician collaborators chose to apply the Life Pulse to those infants who represented the most difficult challenge in the field of newborn intensive care. These patients were premature infants whose treatment with conventional ventilators had produced lung damage sufficient to place them in immediate danger of dying. Dr. Bunnell and his colleagues felt that a controlled study in this patient population would be tantamount to a death sentence for those infants who were randomized to the control group.

With nearly a hundred infants treated by the end of 1985, Dr. Bunnell submitted a lengthy application to the FDA for approval of the device. It was rejected and a three-year battle for approval ensued. What began as a battle ended in cooperation as Bunnell, his physician investigators, and a handful of key FDA staffers put together thousands of pages of evidence from an expanded group of 200 desperately-ill infants that the product was both safe and effective. By the time FDA approval was finally granted on June 30, 1988, the company was deeply in debt, Dr. Bunnell had gone three years without a salary, and the company's industrial backer had lost interest.

With exactly half of the original 200 infants as living testimony to the value of the Life Pulse, 20 hospitals who paid Bunnell to keep the equipment coming, and almost daily calls from other hospitals all over the world who had heard or read of the success of Bunnell's new ventilator, Dr. Bunnell and a score of faithful employees were able to dig themselves out of their financial hole. By June, 1989, Bunnell had regained the marketing and manufacturing rights to all of its products and paid off its debts. Dr. Bunnell has spent years doing research and testing, and millions of dollars to reach the milestone of commercializing his high frequency ventilator.

History of Bunnell's Founding

Dr. Bunnell began this work in 1972. After spending several years in academia, he left in 1975 to design medical products for Air Products and Chemicals, Inc. in Allentown, Pennsylvania. Two years later, the company decided not to pursue this line of research and cut off the research funds. At the same time, Dr. Bunnell received a call from a friend who needed an expert in pulmonary physiology. In 1977 he moved to Utah and went to work for this company, Hospal Medical Corporation. Dr. Bunnell continued his research and development on high frequency ventilation with Hospal until 1980. With a prototype nearly ready for clinical trials the company decided not to commercialize the product, and Dr. Bunnell left to form Bunnell Incorporated.

Bunnell Incorporated was founded with the help of the University of Utah's Innovation Center, a project funded by the National Science Foundation for the purpose of stimulating new high tech industries. With the help of the Center and funds invested by family, friends, and a few doctors and engineers who believed in Dr. Bunnell's work, Bunnell began clinical trials with several prototype high frequency ventilators at five key medical centers around the U.S. in 1982.

By 1982, most of the development work for the Life Pulse was completed. Within two years, FDA approval was the only missing component. In 1985 the company submitted the results from its clinical trials to the FDA. One reason for the FDA's initial refusal to approve the ventilator was the fact that the FDA did not understand the technology of the ventilator or its uses. Dr. Bunnell had to educate the FDA investigators; a problem that was exacerbated by the a high turnover rate at the agency. Eventually, the FDA recognized Dr. Bunnell's position, but only after the company had incurred huge expenses.

Funding

Bunnell, Inc. has experienced the financial highs and lows common to high tech companies. Unlike other high tech companies, however, as a medical company, Bunnell has made an incredible investment in research and testing. The company has invested over $2 million to develop the ventilator. From the date of incorporation, it took over eight years to develop, test, and finally gain FDA approval for the product.

When Dr. Bunnell launched his company he did not have extensive capital resources or financial backing. His first step was to associate with the Utah Innovation Center. In exchange for 30 percent equity in the company, the Center provided an office, a laboratory for his research, administrative assistance and business advice. On a limited scale, the Utah Innovation Center acted as an incubator for Bunnell.

The second important financial event for the company was the development of a spin-off product, the Ventilator Monitor. This device is a computerized monitor for patients on life support equipment. Sales were robust in 1982 and 1983 at $316,000 and $583,000, respectively. However, research costs continued to absorb revenues as the clinical trials of the high frequency ventilator blossomed. For the same two years, the firm reported R & D expenditures of $253,000 and $332,000. In 1984, sales dropped because of distribution problems and the company was stuck with excess inventory.

The company's third crucial step was its association with a major medical company which was currently involved in the manufacturing and selling disposal medical supplies. This company was interested in manufacturing disposable supplies for Bunnell's Life Pulse High Frequency Ventilator and in marketing all of Bunnell's products. It was also willing to play the role of venture capitalist for Bunnell in order to broaden its product base.

The major company purchased 12 percent of Bunnell Incorporated and, as part of the purchase agreement, guaranteed a line of credit for three years. This arrangement allowed Bunnell to continue its research. In addition to providing dollars, Bunnell's corporate partner attempted to market the ventilator product for investigational purposes; however, this attempt was not successful. Constraints imposed by the FDA on selling un-approved devices were just too difficult for the larger corporation to handle. By 1986, it was ready to change directions and wanted out of the equipment business.

Sales dropped to $110,000 in 1986—the lowest level in five years. At the same time, because of the costs associated with gaining FDA approval, the company's R&D expenses continued to drain its revenues.

Despite these financial problems the company survived 1986 by regaining its marketing rights from its corporate investor. Sales climbed to $419,000 in 1987 and for the first time in many years R&D costs declined. The surge in sales reflects the success Bunnell had in selling the Life Pulse Ventilator to hospitals which were testing the device under FDA approved protocols.

Product sales rose to $902,000 in 1988 as a consequence of its FDA approval for the Life Pulse at the end of June. Bunnell also realized a small profit for the first time in the company's history. Based on company projections, sales will skyrocket to $2.8 million in 1989, and $5.83 million by 1990. To meet these objectives the company is raising new investment capital which will allow the introduction of Bunnell's new products for pediatric and adult intensive care and anesthesia markets in 1990 and 1991. These new products will broaden the firm's product line and solidify its position in its medical market niche. At some point in the next few years, the company plans to issue an initial public offering.

Products

Bunnell's primary product is the Life Pulse High Frequency Ventilator. At a cost of $23,900 per ventilator, the Life Pulse is over twice the price of a conventional ventilator, and generates very attractive gross margins. Bunnell is also developing a model which can be used by adult patients. The only major development left for completion of this model is the design and fabrication of injection molds for scaled-up disposable humidification chambers. Successful preliminary clinical trials of the adult model have already been conducted at one hospital.

In retrospect, Dr. Bunnell concedes he was far too optimistic regarding the intricacies of obtaining FDA approval. He consistently underestimated the time and expense. Initially, he expected approval within one year. After the first year passed, and then the second, he thought approval had to be around the corner. It was not. Fortunately, since the adult model ventilator uses the same software and hardware as the infant model, it is expected that FDA approval will not be as difficult to obtain.

A related product, the Ventilator Monitor, was spun off the development of the Life Pulse in 1982. The Monitor is designed to measure the pressure delivered to the lungs of patients who are being supported by conventional ventilators. It also alerts the nursing staff of any irregularities in ventilator pressure or rate fluctuations that may be hazardous to the patient. Bunnell has sold over 1,200 of its Ventilator Monitors since 1982. Revenues from this product helped to sustain the company in its early years. The company plans to develop an improved monitor in the next few years. This new monitor will serve as an accessory to clinicians using the Life Pulse.

Bunnell recently began manufacturing and distributing the disposable supplies for its Life Pulse High Frequency Ventilator. These humidifier cartridges and tubing sets presently sell for $78 and last for up to five days before they must be discarded. As the installed base of Life Pulse Ventilators increases, these supplies will provide a more and more significant contribution to Bunnell's revenues. Bunnell also makes and resells various support accessories for its ventilator and monitor such as a cart, mounting brackets, an uninterruptible power supply, and an air/oxygen blender.

Other products expected to be developed by Bunnell will revolve around the care of critically ill infants and adults. The market for conventional ventilators is at least as large as that for high frequency ventilators, and the company has gained an excellent reputation in this field for its innovative abilities and customer service.

Market Potential

Dr. Bunnell estimates that the market for his high frequency ventilator is substantial. There are approximately 750 newborn intensive care units (NICUs) with 10,000 beds in the U.S. It is estimated that one high frequency ventilator will be required for every six NICU beds (1,667) and that the number of NICU beds will continue to grow at 5 percent every year through 1993.

Approximately 10 times as many intensive care units for adults are in use (7,500) with 8.5 times as many beds (85,000). There are also 2,000 cardiac care and 400 pediatric intensive care units in the U.S. now with 16,000 and 3,200 beds, respectively. The applications for high frequency ventilation would account for at least one unit for every 12 beds in each of these settings.

In evaluating market potential for Bunnell's products, two considerations are very important. The first and perhaps most important is the proprietary position of the company. Bunnell has four patents protecting the crucial aspects of the Life Pulse. One patent protects the all important jet valve and its location near the patient's head. The position of the jet valves results in crisp, undamped gas pulse delivery. In effect, the company feels that this gives Life Pulse a considerable competitive edge and extends the market opportunity of the device.

Market opportunity is the second important consideration. The company believes the high frequency ventilation will be widely accepted because it is a superior technique. Bunnell's competitors were recently crippled in this market by the results of a National Institutes of Health study which revealed that high frequency oscillation is associated with a significantly higher incidence of brain and lung damage. All of Bunnell's principal competitors use high frequency oscillation in contrast to the high frequency jet ventilation used by Bunnell. These firms must satisfy FDA's claims that their devices do not cause an increase in these adverse side effects.

Bunnell has invested a great deal of time and money into the development of its ventilator. These expenses combined with the company's patents, and the adverse findings of the FDA should allow Bunnell to dominate the market for at least four years.

Management and Employment

Dr. J. Bert Bunnell, the founder of the company, serves as its President and CEO. Dr. Bunnell graduated from the University of Utah and received a doctorate degree from M.I.T. in chemical engineering. Prior to founding Bunnell, Inc. he had worked in high frequency ventilator research as an academic and later as a researcher with two private companies. However, he did not have any business or finance experience; both skills were acquired through "on-the-job-training", although he did receive some assistance from the Utah Innovation Center. Until recently, Dr. Bunnell was responsible for all the management and financial activities of the company.

Ping Fong joined Bunnell in 1989. He is Vice President and General Manager which covers all company functions except research and development and marketing. He and Dr. Bunnell worked together previously at Air Products and Chemicals, Inc. Mr. Fong has an M.S. in mechanical engineering, an M.B.A., and has considerable management experience in both large and small companies.

Roger Atkins has worked with Dr. Bunnell since 1979 in various capacities, and is presently directing the company's research and development activities. Mr. Atkins has made significant contributions to the frequency ventilator, designed and developed the humidification system for both the Life Pulse and the

Infant Full-Feature Ventilator and responded to the technical requirements of the FDA approval process for the Life Pulse. He also has extensive experience in computer software designs and was one of the primary contributors to the electronic design of the Life Pulse.

Twenty people presently work at Bunnell, Inc. Several years ago the company employed 24 workers, but financial strains forced many people to leave. In retrospect, Dr. Bunnell feels the company employed too many people for a firm that was not focused and too research-oriented. At the present time, only 4 of the 20 employees are involved in development activities. Dr. Bunnell projects that a total of 25 people will be employed by the end of 1989. Five will be involved in development and 20 in marketing, administration and finance. The company has not had any problem finding qualified workers in Utah.

Utah: An Executive Opinion

Chance played an important role in the company's Utah location even though Dr. Bunnell is a native of the state. When he left Hospal Medical Corporation, Dr. Wayne Brown, a Utah entrepreneur was extremely supportive of Dr. Bunnell's decision to start his own company. Dr. Brown lent his time and effort to making Bunnell, Inc. a successful operation. Unfortunately, a tragic accident claimed Dr. Brown's life in 1988.

It is Dr. Bunnell's opinion that Utah offers many advantages for his company. Leading the list is the company's relationship with the University of Utah and Primary Children's and LDS Hospitals. The company has been able to attract several university graduates and the hospitals have provided an environment where Bunnell's products could be tested.

It is not surprising that after eight years of financial struggle, Dr. Bunnell has very strong opinions regarding Utah's venture and banking communities. According to him, there is too little venture capital in the state. Moreover, the few resources that are available are controlled by too few investors. Utah needs to develop its venture capital resources. With respect to the banking community, Dr. Bunnell feels they are far too conservative and do not understand the needs of small high tech companies like his own.

Dr. Bunnell's final observation deals with the lack of managerial and marketing professionals in the local market. It is very difficult to entice a potential manager to join a struggling high tech company, even if he or she believes in the company. Not only is there a lack of marketing and managerial expertise, there is also a lack of entrepreneurial spirit among those types of people who live in the area.

Recently, an out-of-state development agency offered to arrange a package of financial incentives for Bunnell, Inc. if the company would relocate. Dr. Bunnell is weighing the pros and cons of such a move. One strong enticement is the offer to finance the company's expansion. Given the promising future of Bunnell, Inc., it would be a great loss for Utah if the company relocated.

Bonneville Scientific

Background

Founded in April 1981 by Allen R. Grahn (current president) and Lynn Astle, Bonneville Scientific is a small company that specializes in the research and development of sensor technology for robots. The company was established with funds from a Small Business Innovative Research (SBIR) Phase I grant to study the feasibility of using ultrasonic radiation to separate proteins. Funding for Bonneville's research has come primarily from the federal SBIR program. The company has received more SBIR grants under this federal program than any other company in the state. Bonneville has successfully blended research and product development, and is beginning to custom manufacture tactile sensor systems. In addition, this Salt Lake City-based firm is expanding its potential by spinning off a new high technology company which promises to expand this company's horizon.

Products

The company has developed two products related to sensor technology. The first product is the tactile sensor. The basic principle of operation of the tactile sensor is an ultrasonic pulse-echo ranging that generates an image of the surface of an elastomeric pad located on the gripping surface of a robotic end-effector. As the robot grasps an object (a cylinder, for example) the elastomeric pad conforms to the surface of the object and is compressed. An array of transducer elements measure the compression of the elastomer which is proportional to the normal force applied to the pad. The distribution of these force measurements is used to create a composite force/shape "tactile image" of the cylinder.

The tactile sensor represents an important breakthrough in the use of robot sensor technology. A major advantage of this sensory technique is the measurement of time intervals rather than signal amplitudes. All other tactile technologies rely upon the measurement of the amplitude of some response. Because of elemental variation each element is usually individually calibrated. With this technology, as long as the signal is large enough to be detected, the signal amplitude is unimportant, and calibration is not necessary. This greatly improves the reliability of the tactile sensor, and reduces the cost of use by increasing the efficiency.

The second device developed by Bonneville Scientific is the force-torque sensor. This device is designed to measure all six orthogonal force and torque components. With further development, the force-torque will be small enough to be mounted upon the gripping surface of a robot end-effector. The sensor consists of an elastomeric spring element joining two parallel plates. Ultrasonic pulse-echo ranging is used to detect fine movements of one plate relative to the other. This position information is utilized to measure and resolve the six force and torque components. This project is being supported by an SBIR contract from NASA.

One way to illustrate the usefulness of the force-torque sensor is to imagine a conveyer belt carrying parts that will be assembled by a robot. Normally, if one part is not positioned correctly on the belt the robot sensor will not be able to pick up the part and assemble it. With the force-torque the sensor recognizes the part is not positioned correctly, and makes the necessary adjustments. In essence, the force-torque sensor is a "smart device" that is, the sensor can make automatic adjustments. The development of this sensor system was initially supported by SBIR grants from the National Science Foundation and the Department of Energy.

Funding

As mentioned before, the start-up funds for Bonneville Scientific came in 1981 from an SBIR Phase I grant to study the feasibility of using ultrasonic radiation to separate proteins. Although the research was not successful, Bonneville won another SBIR grant soon after, which kept the company operating. After 18 months, the company won a Phase II SBIR grant to continue its research on robotic-touch sensors. The founders readily admit that without the SBIR program Bonneville Scientific would not have been started. Bonneville has been uncommonly successful in attracting such grants. To date, the company has received a total of 16 SBIR's from the following agencies: National Science Foundation (8), Department of Energy (3), NASA (3), National Institutes of Health (1), and U.S. Navy (1).

The company has also received research monies from the Utah Technology Finance Corporation. In 1988, the company was funded for over $600,000 and over the past four years has spent more than $2 million for research. In essence, the SBIR program has acted as a venture capitalist for Bonneville Scientific by providing capital and development opportunities.

At the present time, Bonneville Scientific is a candidate for venture capital. The company's principal thrust is research and as such, it lacks the market potential to attract investment capital. While Bonneville has several proprietary products which may offer market opportunity in the future, commercialization is still years away.

Market Potential

Its research orientation is not the only concern for Bonneville. Another problem is the nature of the research. Ten years ago, robotics was the wave of the future. Manufacturers rushed to develop robotics as a way to reduce labor costs in an inflationary economy. However, when inflation slowed, the wage spiral was broken and with it the main impetus for robotics. Since 1982, demand for robotics in manufacturing has declined significantly. Undoubtedly, this trend will reverse itself. The use of robotics is an effective way to reduce labor costs and improve efficiency.

Management recognizes the problem of relying on just research and having a specialty which is not in vogue. In an attempt to broaden the firm's potential, Bonneville Scientific is forming a new high tech firm with the University of Utah. The University owns the technology which is the foundation of the new company called Bonneville Microelectronics and will retain an equity position. Bonneville Microelectronics will specialize in integrated circuits. The objective in forming another entity is to use it as a cash provider for supporting the longer term robotic products. The founders realize that the market window for Bonneville Microelectronics is narrow and that its product life cycle is short. Nevertheless, the goal is to take advantage of current demand while creating sales revenue at the same time.

Preliminary interest has been strong and the company started marketing the product several months ago. Based on initial sales, the company expects to realize between $5 to $10 million in sales within a few years.

Management and Employment

Dr. Allen R. Grahn is President and founder of Bonneville Scientific and oversees the company's research activities. He is also the principal investigator for NSF grants on acoustic protein separation and robotic force sensor arrays and VLSI implementation of an image segmentation algorithm. He has been associated with the University of Utah as well as the

UBTL Division of the University of Utah Research Institute. Dr. Grahn is a well recognized authority in his specialty and has many articles dealing with ultrasound and remote sensing.

The daily business operations (administration, finance and personnel) are handled by Dr. Lynn Astle. His research experience includes positions with the Department of Medical Technology at the University of Utah, UBTL Division, and Research Institute.

The company's employment level varies with its research contracts. Currently, the firm employs 10 people, eight of whom are researchers. The company has filled its research positions with people from the Salt Lake area. Based on his experience, Dr. Astle believes there is a surplus of fine researchers. In one instance, the firm advertized for a part-time researcher and received 75 applications from qualified people in the Salt Lake area.

Because the firm is small and research-oriented, project leaders manage the work flow and Dr. Astle manages the operations. The two most important tasks of the company are: (1) to produce quality research on schedule at budget and (2) to develop its sensor products. Both Dr. Astle and Dr. Grahn are involved in every research project.

Utah: An Executive Opinion

The founders of Bonneville Scientific love Utah and have gone to extraordinary lengths to remain in the state. They feel their relationship with the University of Utah has been extremely rewarding as well as instrumental to their continued success. Both founders have served as faculty members at the University and rely on the school to provide researchers. Dr. Astle goes so far as to say that without the University of Utah there would be no Bonneville Scientific.

In addition to a supportive university, Bonneville's CEO feels that the labor market in Utah is excellent. The company is able to hire qualified researchers at very reasonable wages and salaries. Many of the researchers, as well as the founders, are willing to accept a lower salary because of the quality of life offered in Utah.

The only negative mentioned by the CEO is the banking community. Bonneville has had difficulty establishing a long-term relationship with a lender. Dr. Astle admits, however, that his company is fiscally conservative and this may have limited the type of services needed from a lender.

CardioPulmonics, Inc.

Background

CardioPulmonics, Inc. is an emerging medical company founded by Dr. J. D. Mortensen, a senior cardiovascular surgeon at the University of Utah Hospital, and Larry Rigby, an experienced entrepreneur in the health care field. The company was formally established in April 1985 after Dr. Mortensen completed a SBIR Phase I grant. It was this initial research which launched the partnership and CardioPulmonics. In September 1985, the firm received a SBIR Phase II grant for $500,000 to continue the original research. Based on this second stage research, CardioPulmonics developed its first product—an intravascular oxygenator (IVOX), and has since developed several other related products—an extravascular oxygenator (EVOX) and a portable heart/lung machine.

Products

CardioPulmonics has developed a blood gas exchange device (artificial lung) and other cardiovascular technologies. Based on these core technologies, the company is currently developing a temporary, intravascular oxygenator (IVOX) designed to be used on certain acutely-ill patients in the intensive care units of hospitals.

The IVOX is an intravenous blood gas exchange device to permit adding oxygen to, and removing carbon dioxide from, circulating blood in patients with advanced respiratory failure. This small, state-of-the-art membrane oxygenator makes use of a highly sophisticated membrane and device design technology. IVOX is inserted like a catheter into the patient's vena cava (venous) system for temporary respirator support of assistance (up to 10 days).

The initial clinical tests were completed in 1986 and a patent was granted in April for that year. The company is now preparing to begin human clinical trials necessary for FDA approval. This approval for IVOX is expected by 1990, at which time production and marketing of the device can begin.

The second major product under development is a spin-off of IVOX. EVOX is a long term, extravascular oxygenator which operates in the same manner as IVOX except that it will be used by the patient for longer periods of time.

A portable heart/lung machine (MEHEALUS) is the third product being developed at CardioPulmonics. This device will function as a portable, semi-automatic emergency-like support system to achieve physiologic stability and maintain vital organ viability of patients in acute, severe, and potentially reversible cardiopulmonary failure. One of the key components of this system incorporates the core membrane technology developed for IVOX. A broad patent for this technology was granted in September 1986.

While the testing and development of IVOX is farther along than the other products, the company is attempting to keep EVOX and MEHEALUS on the development track. However, since the technology used to develop IVOX is the core technology for spin-off products, the company's objective is to proceed as quickly as possible to achieve final approval for IVOX.

Funding

A Phase I SBIR grant funded the initial research that is now the cornerstone of CardioPulmonics' technologies. Based upon the favorable results of this research, Dr. Mortensen and Larry Rigby entered into a partnership whereby each contributed seed capital. CardioPulmonics won a Phase II SBIR grant for $500,000 to continue the original research. In 1986, the firm received a capital infusion of $200,000 from the Utah Ventures (a Utah-based venture capital company). This commitment was important for two reasons: first, the capital helped fund the start-up costs; and second, the investment helped attract other venture investors.

In 1987, the firm entered the big leagues of venture investment. With Montgomery Medical Ventures acting as the lead investor, Columbine Ventures and Alan Patricof Associates joined forces and invested $2 million. The company also received $50,000 from the state of Utah in 1987 that was used to research aspects of the company's membrane development thrust. In March 1988, the company received an additional Phase I SBIR grant from the National Institutes of Health.

The firm has successfully mixed grant and investor capital to meet its revenue needs; and those needs are significant. An unofficial estimate is that venture capitalists will invest approximately $5 million before the IVOX device is introduced to market. The firm does not yet have a marketable product because it needs the FDA's approval. It may be another two years before it is able to sell IVOX and perhaps 1991 until the other products are on line. To realize this goal, Larry Rigby feels the company will need between $3 and $6 million. Although some of that may come from additional SBIR grants, the majority must come from venture capital or other corporate sources.

The strength of the CardioPulmonics management team explains the company's success in attracting capital. Larry Rigby is an entrepreneur with experience in managing small medical start-up companies. He has taken Dr. Mortensen's research product and developed a company. For his part, Dr. Mortensen is widely recognized as a leader and innovator in the firm's specialty.

Market Potential

The three interrelated products which have been selected for development have tremendous market potential. For example, IVOX and EVOX have an estimated U.S. market potential of $400 million. MEHEALUS has an estimated U.S. market potential of $43 million for disposables and an additional $50 million for hardware. A patent with broad protection for IVOX was granted in April 1986. Additional patent applications are pending.

Management and Employment

Larry Rigby is the President and CEO of CardioPulmonics. His background is in the development and management of start-up companies that specialize in the manufacture and distribution of hospital medical devices and equipment. As an entrepreneur, Mr. Rigby has had experience in the funding of start-up ventures; his experience with venture capital investors has been very important for the firm. He is also involved in three other medical start-up companies, although at the request of his investors at CardioPulmonics, all of his time is now devoted to that company.

Dr. J. D. Mortensen is the Chairman of the Board and Chief Technical Officer of the firm. His research activities led to the creation of CardioPulmonics in 1985. Dr. Mortensen has been on the clinical faculty of the University of Utah's College of Medicine since 1955. As Director of Surgical Research at the UBTL Division of the University of Utah Research Institute, Dr. Mortensen has done extensive work for NIH, FDA, and private companies in the fields of vascular grafts, mechanical cardiopulmonary bypass equipment (heart/ lung machine), ECMO (extracorporeal membrane oxygenation) perfusion, cardiac catheters, cardiac valve prostheses and blood/materials interfaces.

Other researchers and professionals have joined CardioPulmonics in the past three years. Gaylord Berry, Vice President of Development, and Dr. Suzanne Winters, Membrane Project Manager, are specialists in their fields. Because regulatory issues can make or break a company, a regulatory affairs specialist has joined the firm to guide CardioPulmonics through the regulatory maze.

CardioPulmonics also has a scientific advisory board consisting of four well known authorities. This committee advises the firm on technical and research matters related to product development. Presently, CardioPulmonics employs 12 professionals and support workers plus six part-time workers who are graduate students at the University of Utah. The firm plans to add two more professionals by year-end. With the exception of two clerical workers and the president, everyone at the firm is involved in R&D.

Utah: An Executive Opinion

After having started several companies in Utah, Mr. Rigby has very definite opinions about locating a firm here. Overall, he believes Utah's advantages far outweigh its limitations. Heading his list of advantages is the area's infrastructure. He identified four components of that infrastructure which have helped CardioPulmonics succeed: (1) a strong research University specializing in medical/biomedical research, (2) qualified researchers, (3) low labor costs, and (4) a strong support industry. These types of infrastructure help a young firm control costs and expenses.

Utah's quality of life is also another plus. High tech researchers and managers are attracted to the area and are willing to work for less than national salaries because the recreational opportunities and clean living environment are unparalleled.

Mr. Rigby feels that the dearth of venture capital is hampering Utah's entrepreneurial climate. The lack of local venture capital and investors is the missing link. According to Mr. Rigby, it is a two-way street. Venture capital stimulates entrepreneurial activity, just as entrepreneurial activity stimulates venture investments. Utah has plenty of entrepreneurial opportunity, but no capital; that side of the street is closed. "Why?"

He suggests that one reason may be Utah's "flim-flam image" which discourages outside investment. The lack of stringent security regulations was cited by Mr. Rigby as a contributing factor. Whether or not this observation is justified, Utah is perceived as a financial community where stock manipulations are the norm rather than the exception. Utah needs to deal with this perception if it is to succeed in attracting new venture money.

Mr. Rigby feels the importance of Utah Ventures, the University of Utah and the Utah Innovation Center cannot be understated. Without the support of all three, it is very likely CardioPulmonics would not have emerged as one of the state's possible success stories in high tech development.

Capital Solutions, Inc.

Background

Capital Solutions has had a circuitous business development that spans over 19 years. The genesis of the company began in the late 1970s when Mr. LeRoy Parker developed a computerized accounting and inventory control system designed specifically for glass retailers. In 1980, Mr. Parker started his own company and called his newly developed software system the LePic Auto Glass System. By 1984 the system had been installed in two glass retailing companies—Massa Glass and Jack Morris Auto Glass.

In 1985, all assets of LePic Systems were acquired by Capital Systems, Inc., a micro/mini computer company. Just one year later, Capital Systems was acquired by SHL Systems House of Canada. With SHL providing the long term financing, LePic Systems was acquired by Capital Solutions, a newly formed private corporation founded by Mike St. Claire—former LePic division manager under Capital Systems.

Capital Solutions was incorporated in 1986. While the company has undergone several corporate changes, its primary focus is to support the glass industry generally and the auto glass retailers and wholesalers specifically, by developing and enhancing the original LePic System. Capital Solutions, Inc. is located in Provo, Utah.

Product

The primary product of Capital Solutions is the LePic Glass System. This software operates on a broad range of computers from a small IBM/PC with a single user to a large IBM mainframe. The LePic System is not hardware dependent; however, it can run on AT&T, Fujitsu, Honeywell, NCR, and Unisys along with others. It has the capability to meet the accounting, inventory, and management information needs of the auto glass industry. For example, the LePic Auto Glass System provides complete accounting capability; purchasing capability to track purchase orders and provide an up-to-the-second inventory usage history; management reporting system, producing standard sales, inventory and accounting reports; inventory tracking and control; detailed invoice generation; parts look-up directly by part number and/or indirectly utilizing NAGS catalog; and, on-line capability for instant quotes or work orders for follow-up. From this listing, it is clear that the LePic System provides a full range of capabilities for the auto glass industry. There are two versions of the LePic System which are used by wholesale glass and flat glass businesses. These versions have the same inclusive capabilities as the auto software.

Capital Solutions plans to broaden its basic product line by developing less expensive, lower capability products which can be sold and serviced on a higher volume basis. C. R. Lawrence, for example, is interested in a low cost subset of the auto glass quoting software which could be sold in volume through their catalog to MS/DOS users. The Glass Industry Purchasing Association has accepted a proposal for a low end automation package that will provide only the very basic capabilities. The last product under development is a retail point-of-sale system. The company plans to focus on the retail office products market. There is an estimated market of 8,000 retailers and virtually no computer penetration at point of sale.

Market Potential

Capital Solutions does not have a diverse product line, nor does the company intend to develop a different line of software. In other words, Capital Solutions is a specialist. The company's marketing strategy is to reach the various market segments within the glass industry by tailoring its basic software package.

The glass industry is made up of five general segments: insurance replacement business (primarily auto sales), wholesale distribution, full service glass business, glass manufacturing, and storefront construction. The first three market segments are being addressed by the firm's present product line. (The auto industry is its best market.) The company plans to penetrate the glass manufacturing and storefront construction business markets because the LePic System is fully adaptable to these segments. The issue is simply one of marketing. The firm plans to reach these markets by forming joint ventures with other firms which are now active in these segments. The attraction for the active firms is the superiority of the LePic System. The company's primary objective is to become the dominant computer system supplier to the retail/wholesale glass industry in all five segments. The firm is aiming for a 12 percent market penetration in the domestic market and gross sales of over $20 million by 1991.

Funding

The financing for Capital Solutions was a combination of bootstrap and debt financing. Mike St. Claire provided part of the start-up capital, and SHL Systems House provided the long term debt used to secure the initial assets (namely the accounting system software). To date, the company's internal operations have been funded by cash flow from sales revenues.

Sales

A minimum-size complete system presently sells for about $10,000 with the average sale running about $30,000. To date, the company's largest sale to a single customer was approximately $250,000. The company estimates that the market potential for its existing and expanded products is $260 million. International sales, especially to Canada, Australia, New Zealand and Europe, also provide an enormous market because the international glass industry in these areas operates much like the U.S. market.

In 1986, the company realized $732,000 in sales and preliminary figures for 1987 show revenues totaling $1.3 million. The company hopes 1988 will be a banner year with $3.5 million in revenues.

Management and Employment

In 1987 the company employed 12 people. Six of Capital Solution's employees are members of the company's management team.

Capital Solutions was purchased from SHL Systems House by Mike St. Claire—a former division manager for LePic Systems. Under the buyout agreement, SHL provided the long-term financing for the purchase by carrying back a note payable. Mr. St. Claire is the president of the company and has over 19 years experience in the computer industry with a business background including applications programming, systems programming, system design, communications, hardware/software evaluation and procurement and management.

John Wharton is the Vice President and Technical Director of Capital Solutions and is responsible for product development. He also serves as Controller, overseeing the company's accounting system. He has over eight years experience in the computer industry and served as controller for a large lumber company in California. Allen Langford is Product Manager responsible for development and marketing efforts for a product that the company is developing with Mr. Langford's company.

Utah: An Executive Opinion

Mr. St. Claire feels that Utah is an excellent location for his company. The productivity of the labor force is one benefit he identified. However, being located here poses a problem for small companies that are trying to raise capital. Capital Solutions is currently looking for $750,000. Mr. St. Claire feels his company must look outside the state for this money.

Epilogue

In July 1988, Capital Solutions ceased business operations. In discussions with former employees, it was clear that several key events occurred which adversely affected the company's ability to remain an ongoing concern. Prior to the date specified by SHL for the first installment due from Capital Solutions, Mike St. Claire wrote and requested an extension.

SHL refused, and called the note due. However, the company was experiencing severe financial problems even before this. According to a former employee, management was an important factor in the company's failure.

The company's labor force was too large to support with the existing customer base. In order to meet payroll, the company had to sell two to three large systems each month. When the marketing team failed to meet this goal, financial problems ensued.

At the point Capital Solutions went out of business, some employees had not been paid for several periods. However, management was hesitant to lay off employees, even when it was obvious that some were not performing. The company was also heavily in debt, a situation that precluded any additional investment financing. Complicating this problem was the fact that the company's market niche was extremely narrow, and would not offer a venture investor the rate of return necessary to make the investment worthwhile.

Clyde, Inc.

Background

With the help of his two sons, Robert and Steven Clyde, Alan Clyde developed the company's basic product line nearly eight years ago. Mr. Clyde was a typical technical entrepreneur with a strong technical background (which was enhanced by the technical creativity of his sons), and a vision and determination necessary to begin a company on a shoestring. After a fast start, the company's growth stalled and Al Clyde had to look for money outside his organization in order to survive. In 1982, investor financing was obtained and within a short period Alan Clyde was forced out of the organization. In 1986, David Bailey (an experienced high tech executive and founder of Iomega) joined the firm on a temporary basis and a search began for a qualified, experienced manager. In April 1988, the company hired Jim Murdakes as president and CEO. Since 1981, Clyde, Inc. has grown from a family organization to a professionally-managed company that is a leading developer of innovative software in the areas of computer security, system support utilities, communication software, and productivity tools.

Products

Clyde, Inc. has two distinct product groups that represent divisions within the company. Security and Support products are the company's mainstay. The second product, ProCODE, is currently in three beta test sites. Clyde's products appeal to four separate markets—System Security, Support and Training, Communications, and Computer-Aided Software Engineering.

Clyde entered the computer security market in 1985 with the introduction of ClydeSENTRY. This software program protects dial-in lines from unauthorized users by requiring dial-in users to enter an ID code. The program hangs up the line and then redials the user at a pre-determined number before the user can access a particular program. ClydeSENTRY also has the ability to limit the menus a user can access and can secure logged-in terminals while users are temporarily away from their stations.

Clyde's System Support and Communications products provide a variety of systems management functions that improve the functionality and usability of the computer. Products include INSTRUCTOR, ATTEND, CONTRL, CALOUT-Plus, and ProMAIL.

INSTRUCTOR and ATTEND: INSTRUCTOR can be used to demonstrate software on several terminals at one time. With the optional ATTEND module, students can connect their terminals to the instructor's at any time during a demonstration and send a signal if they have questions. Answers can be sent from the instructor's keyboard.

CONTRL: CONTRL allows a supervisor to connect his or her terminal to any other user's terminal to show on the terminal screen (rather than attempt to explain) a particular idea or activity. Both users see the same thing on the terminal screen, and both can enter data from the keyboard.

CALOUT-Plus: Large organizations have geographically distributed computer resources, and must solve the problem of communicating between their various computer sites. CALOUT-Plus provides the ability to link to any site and allows the exchange of data between sites. CALOUT-plus can be automated so that this exchange can proceed unattended.

ProMAIL: ProMAIL provides automated electronic mail transmission between VMS Mail and EasyLink network without human intervention. In April 1989, Clyde private-labeled ProMAIL to Western Union and will no longer sell this product. These system support products sell for $2,000 to $16,000 depending on system model and configuration.

Also in April 1989, the company signed a non-exclusive agreement with Hamilton-Avnet to sell Clyde Security and Support products in Canada. This is an important milestone as Hamilton-Avnet is a major distributor of Digital Equipment Corporation's products. Clyde's products are compatible with this system.

The second product family includes ProCODE. This is a software innovation that can be used in the Computer-Aided Software Engineering (CASE) market. It incorporates leading edge technology for automating the programming of application software. The company hopes to have version 2.5 of ProCODE in six beta test sites by June 1989, although ProCODE is still in a research and development phase. This version will generate code in VAX BASIC for applications that access RMS and Rdb/VMS data files. Future versions will support graphics, SQL, additional language options such as COBOL, and will multiply hardware and operating systems such as UNIX and MS/DOS.

Funding

Clyde Digital, Inc. (the original company) was a bootstrap endeavor. Mr. Clyde provided the initial financing for the venture. Although initial market acceptance of Clyde's product was encouraging, additional capital was needed. Utah Ventures, a Utah-based venture capital company, provided Clyde with $200,000. This small investment attracted additional venture money for a total investment of $2.8 million. The company has also raised money by issuing stock in lieu of cash payment for services, and by selling common stock to investors through a private placement to offset operational deficits.

According to Jim Murdakes, the company needs at least $5 million to finish ProCODE development. High development costs and sales and marketing expenses have resulted in three consecutive years of before-tax losses, totaling $1.48 million. The culprit has been the development costs associated with ProCODE. At present, ProCODE development costs are averaging $130,000 per month with no revenue offset, causing financial concerns for the company.

Sales

Despite three consecutive years of losses, Clyde has managed to keep the doors open and in August 1988, the company made money for the first time since its inception. Although the company suffered a small setback in the first quarter of 1989, Mr. Murdakes feels it will again be profitable by the end of 1989. Clyde had sales of $1 million in 1986; $2.2 million in 1987; and $2.8 million in 1988.

Market Potential

The market for Clyde's products is tied to the installed base of VAX/VMS general purpose computers manufactured by Digital Equipment Corporation. Computer Intelligence Corporation estimated that there were over 93,000 installed sites with more than 132,000 VAX/VMS CPU's in the field by the end of 1988. This number is expected to rise to over 420,000 by 1992. The market expansion of DEC's VAX/VMS systems will provide an ever-increasing market for Clyde's product lines. The market for the security systems product alone is expected to reach $12 billion by 1995 (Electronics Industries Association).

Management and Employment

In April 1988, Jim Murdakes assumed the positions of President and CEO. Prior to joining Clyde, Inc., Mr. Murdakes spent 25 years in various management positions with Control Data Corporation (12 of which were spent as Vice President, responsible for marketing the company's computer systems worldwide). The original founder is no longer involved in the company's operations, although his sons hold positions in the company (Robert Clyde is Vice President, directing product development, and Steven Clyde is the principal engineer for new technologies.)

The lack of a well-defined sales and marketing strategy, combined with poor management kept Clyde Digital from realizing its potential. Under Jim Murdakes' management, sales and marketing were given top priority. Under the salary structure developed by previous management, the marketing and direct sales efforts were not generating sufficient income. Mr. Murdakes felt that the lack of sales was tied to the unusually high base compensation for direct sales personnel. There was simply not enough incentive to sell. In addition, the skewed compensation structure for direct sales personnel was affecting the efforts of the telemarketing division. One of the first steps of the new CEO was to redefine the compensation package for the direct sales force so that sales results matched income. Base salaries were reduced, while commissions were increased.

The management structure of Clyde is separated by function; that is, there are two main divisions, R&D and marketing. The R&D division employs 23 people, mostly technical staff; the marketing division employs 20 people. The managers of both divisions report directly to the CEO. Administrative services such as accounting, personnel and finance employ 12 people, and is managed by the CEO.

Presently, Clyde employs 67 people; if all goes according to plan, the company will employ 85 people by the end of 1989. New workers will most likely join the marketing division. The company expects to fill these positions with local workers. Telemarketing is an important sales technique for Clyde. The sales force is made up of both part-time individuals who are paid an hourly wage with a strong commission incentive and full-time, entry level salespeople.

Utah: An Executive Opinion

Jim Murdakes, president and CEC, came to Utah from Minnesota and brings with him a fresh perspective concerning Utah as a high tech center and as a place to live. He likes Utah and feels it provides a pleasant working environment. However, he also indicated that he has had problems motivating the local work force. Some of his top people, and a good number of his top producers have been recruited from outside the state. In his opinion, finding qualified, motivated people in Utah is a challenge.

Globesat, Inc.

Background

Globesat was formally established in 1984 and is a spin-off of the atmospheric and space research being undertaken at Utah State University. Founded by Dr. L. Rex Megill, with financial assistance from Dr. Wayne Brown and Don Stringham, the company's objective was to manufacture and market small satellites that could be used to transfer data between low earth orbits and ground stations. Since then, the company has undergone several corporate changes.

In 1987, Globesat completed a merger with a publicly-held corporation. More recently the company acquired another Utah firm in order to enhance its production capability. Although the company has been through a myriad of changes, the development and manufacture of earth satellites for commercial and government customers continues to be the company's main thrust. The company has also developed related products or subsystems which can be marketed separately. The company is located in Logan, Utah, near Utah State University.

Products

Globesat was incorporated in 1984 for the purpose of manufacturing spacecraft to be carried into orbit by the Space Shuttle and by expendable launch vehicles to supply location, communication, earth observation and data relay services to a wide variety of private and government customers. Globesat manufactures two commercial satellites, the GS 100 and GS 200. The GS 100 model is the direct descendant of the Get Away Special Satellites. The original satellites launched from the Shuttle, NUSAT and GLOMR were forced to assume an essentially spherical shape because of safety concerns. However, the GS 100 is built in the shape of a right octagonal cylinder. This shape allows compatibility with either the Shuttle extended canister or with a variety of other launch mechanisms, including the Orbital Express.

The standard GS 100 model includes the command and control computer equipped with two megabytes of memory, a complete power system (including batteries and solar cells with redundant capabilities) an orientation measurement system and the structure. The command and control computer comes with multitasking software and all other software required for satellite operation, including housekeeping and unlinking of new command programs as needed.

The GS 200 is a larger version of the GS 100. This satellite carries all the subsystems offered in the GS 100 plus a power system which has double the capacity. The GS 200 was developed because of the need of many experimenters for larger satellites.

In addition to the GS 100 and GS 200 satellites, Globesat has developed power, control, and orientation sensing subsystems. Each of these subsystems has a commercial potential independent of satellite application. The power system, for example, utilizes solar cells to produce the necessary power for the satellite. This technology can be used in other ways.

Funding

Globesat was initially financed through an R&D partnership (Dr. Wayne Brown and Don Stringham were the financial partners in this funding vehicle). This partnership raised approximately $350,000 for the fledgling firm. Utah State University also provided, on a limited basis, some incubation facilities. Since 1984, the company has used a variety of sources to meet its capital requirements. Globesat has been able to raise nearly $750,000 in contracts from different state and federal agencies. However, the company's capital needs have exceeded this amount and in 1987, Globesat merged with Sure Investment Company—a publicly-traded company later renamed Globesat Holding Company. A private placement through the holding company brought in approximately $500,000 of working capital for Globesat. Recently, Globesat acquired another company. This move helped the company raise much needed capital and at the same time, increase its existing production capability. Presently, Globesat is looking for a venture partner in order to secure additional financing.

Market Potential

Globesat has targeted the low-cost end of the satellite industry as its specialty. Initial plans were to launch these satellites during shuttle missions by ejecting them from National Aeronautics and Space Administration Get Away Special self-contained payload carriers in the shuttle's cargo bay. With the shuttle fleet grounded following the Challenger accident, the company has been forced to consider using expendable launch vehicles. Without question, the Challenger accident was a major setback for Globesat. The accident closed the door on Globesat until shuttle flights resumed. Alternative delivery systems are not feasible because costs for expendable vehicles are much higher than for shuttle-borne launches. In response, Globesat has developed a multiple satellite device which permits accommodation of ten or more satellites by a single launch vehicle. However, in evaluating the company's market potential, it should be remembered that there is a high demand for low cost satellites.

One very promising application of a satellite manufactured by Globesat is a "store-and-forward" function. A store-and-forward satellite would receive data transmitted from ground-based sites and store that data on board. The information then would be relayed to a Globesat-operated central control station in Logan, Utah when the satellite is within line of sight of the ground receiver. According to Dr. Megill, one satellite could serve thousands of those sites each day. Another use of the store-and-forward concept could be tracking trucks or rail cars equipped with small transmitters.

Management and Employment

Globesat is a wholly-owned subsidiary of Globesat Holding Company which acquired two other firms in 1988. Although there is no formal structure between the three companies, there are numerous informal ties. For example, Dr. Rex Megill (the founder) is the president of Globesat Holding Company and Vice President of Engineering for Globesat, Inc. Kent Backman is the current president of Globesat. Mr. Backman has a background in mechanical engineering and was formerly the president of Questronics (one of the recently acquired companies). He has 18 years of managerial experience.

R. Gilbert Moore is Vice President in charge of Advanced Programs. Prior to joining Globesat, Mr. Moore worked for Morton Thiokol Corporation as special projects manager and played an influential role in Project NUSAT (Northern Utah SATellite), a joint effort between Utah State University and Weber State College to build a small satellite that could be deployed from a Get Away Special (GAS) canister.

Globesat, Inc. has 15 employees. Of this total, 10 employees are involved in R&D. Given the complexity of the development and manufacturing of satellites, the research staff consists of individuals with advanced degrees in physics, electrical engineering, and mechanical engineering. Globesat recruits graduates and faculty of Utah State University to fill many of these positions. The company's relationship with Utah State University has been very important. For example, Globesat's proximity to and close working relationship with Utah State University's Center for Space Dynamics Laboratory were important factors in Globesat's selection by NASA to define a spacecraft-based testing platform.

Utah: An Executive Opinion

Globesat was established in Utah because of space research underway at Utah State University. The relationship with the university has played an important part in the company's success. Globesat has been able to draw on the technical talents of USU's faculty. On the other hand, Dr. Megill feels there is a real capital gap in Utah. His company has gone to enormous lengths to find sources of capital. He is of the opinion that venture capital is almost nonexistent in Utah.

Hart Scientific

Background

Hart Scientific was founded in 1979 by Roger Hart and Mike Hurst, while both were employed as engineers at Tronac Engineering in Orem, Utah. According to Dennis Hunter (current President and CEO) the impetus behind the company's formation came from Tronac's president. Both Roger and Mike wanted to expand the company's product line and enter into new ventures. The president was not interested in expanding and the two entrepreneurs left to form their own company. For three years, the founders were the sole employees and they struggled to get the new company off the ground. Finally, realizing that the company stood a slim chance of survival under their management, they began looking for an experienced manager.

In 1984, Dennis Hunter joined the company and assumed all managerial and financial responsibilities. Roger Hart assumed the position of Vice President for Research and Development and Mike Hurst assumed the position of Vice President for Operations. Both founders retained an equity position in the company. Hart Scientific manufactures computerized, scientific instruments—specifically, constant temperature monitoring instruments and temperature-related instruments.

Products

Hart Scientific develops and manufactures a wide range of temperature monitoring instruments. For example, the company has developed a heat conduction calorimeter instrument which is used in battery testing, corrosion studies, materials-aging analysis, chemical kinetics, microbiology and biochemistry. The heat conduction calorimeter can generate a wide temperature range of -40° to 200° Centigrade and has a temperature accuracy of +/-0.5°C and a temperature stability of +/-0.001 typ. A similar instrument, an isothermal flow calorimeter, achieves a -40° to 200° Centigrade temperature range; however, this instrument measures the heat of mixing, dilution and reaction. It is also used in petroleum processing and liquid extraction/separation of supercritical fluids, biochemical studies analyzing enzymes, and concentrated electrolytes.

The company's most advanced temperature instrument is the ultra stable constant temperature bath and circulation instrument. This instrument produces a temperature range of -80° to +300° Centigrade, with an optimum accuracy and stability of +/-0.0005°C to assure exact temperatures settings at all times. Hart Scientific has built calibration baths for the Air Force, thermal shock baths for instrument testing and computerized baths for data collection and analysis for petroleum companies.

In addition to these instruments, Hart Scientific has developed a number of other precision instruments designed to measure variations in temperature and has the capability to design and build temperature instruments to meet specific testing requirements.

Funding

Hart Scientific is a bootstrap, start-up company. The initial capital came from the founders (Roger Hart and Mike Hurst). Both took second mortgages on their homes to raise $25,000 in seed capital. Soon after, they borrowed $100,000 from a private investor to keep the company running. Even with this capital infusion the company had a severe cash flow problem, and the founders began factoring the company's accounts receivables at about 50 percent on the dollar.

Recognizing that they had a problem, the two founders brought Dennis Hunter into the company in 1984. Mr. Hunter had extensive experience in investment banking and management. His first step was to create a R&D limited partnership with local investors. One local investor Mr. Hunter approached was Questar Development, the holding company for Mountain Fuel Supply. This partnership was a natural. Under the terms of the agreement, Questar would utilize the technical expertise of Hart Scientific. This partnership eventually led to an equity partnership (Questar purchased equity in the company).

Mr. Hunter also approached several local banks to establish a line of credit for the company in order to eliminate the cash flow problem. It was only through his personal connections that he was able to secure a line of credit with a local bank. This banking relationship was terminated when his contact left the bank since nobody else understood the nature of the business. The same situation occurred the next year; and finally, Mr. Hunter was forced to go outside the state to secure a line of credit that was large enough to meet the company's needs. In this instance, the financial organization was a holding company for banks located in the Western United States. The holding company made arrangements with a local bank to provide the necessary credit facility.

Hart has recently formed another partnership with Ford Motor Company to develop an emission instrument, and has entered into agreements with Continental Can, Schlumberge and R. J. Reynolds. Recently, additional research monies have been obtained through the SBIR program. The company was awarded $50,000 to complete a Phase I grant and $500,000 for a Phase II grant.

An Initial Public Offering (IPO) may be in Hart's future. Provided the equity market can facilitate an IPO, Mr. Hunter plans on taking the company public within a year. However, if the market is soft, or IPOs are unpopular with investors, the company will most likely continue its strategy of using R&D partnerships, SBIR grants, and equity partnerships.

Sales

Hart Scientific has experienced a phenomenal rate of growth in sales. In 1983 sales totaled only $300,000; however, in the following year, sales jumped 360 percent to $1.4 million. Between 1984 and 1985, sales posted a 35 percent gain to $1.9 million. In the following year, 1986, sales were flat with only a 5 percent increase to $2 million. Sales grew to $2.5 million in 1987 which represents a 25 percent increase from the previous year. For the four-year period between 1983 and 1987, sales grew at an annual average rate of over 100 percent.

Market Potential

Hart Scientific develops and manufactures very specialized temperature calibration instruments. The company's clients include Fortune 500 companies, government agencies, and universities. Last year, domestic sales accounted for 85 percent of the company's revenues while 15 percent of the revenues were generated in the international market. The company has succeeded by specializing in a very technical niche market. Though the market potential for any one of the company's instruments is very narrow, the market for the company's expertise in this field is strong as long as the company continues to successfully develop new instruments.

Because the company is not dependent on just one product, the risk of losing sales is greatly reduced.

The company is not threatened by a new innovation because a single innovation would not impact all instruments and therefore, sales. Second, the company has very few competitors. Finally, the company is not tied to fluctuations in any specific industry; and since the market niche is narrow, the company's products are expensive and provide excellent gross margins. Hart's strategy is to discover and protect a market niche through superior product development. The company advertises in trade magazines which reach a specific user market.

Following a niche strategy has its drawbacks. Even with comfortable margins, the company has no way to improve its revenues through increased production. The production runs are simply too specialized to capitalize on economies of scale or volume. Consequently, the company must continue to find new market niches.

Management and Employment

For the first three years after forming Hart Scientific, Mike Hurst and Roger Hart were the company's sole employees. They tried to do everything: raise capital for the fledgling firm, develop and market the instruments, and manage the day-to-day affairs of the company. Under these conditions it is not surprising that the firm struggled, especially since the founders had little business experience and almost no experience in finance. When Dennis Hunter joined the company, the founders returned to product development activities. Mr. Hart currently serves as the Vice President of Research and Development and Mr. Hurst is Vice President of Operations.

Hart Scientific employs 35 people, 16 of these people are involved in development activities (1 chemical engineer, 2 mechanical engineers, and 13 electrical engineers). In terms of direct management, Mr. Hart is responsible for the technical force at Hart Scientific, although a few of the technical staff report to Mr. Hurst. Four employees are involved in marketing and they report to Mr. Hunter, as does the administrative staff. There is very little employee turnover at Hart Scientific. Although low turnover is characteristic of a high growth firm, Hart Scientific relies on referrals as a way to select new employees and this may also contribute to the low turnover.

Utah: An Executive Opinion

Hart Scientific is located in Utah because the founders lived in the state and wanted to stay after the company was established. Too often, this simple explanation is overlooked. Even so, Mr. Hunter feels Utah is a favorable place for Hart to be located. According to him, one of Utah's best assets is its labor force. The company has met its labor needs with local people who will work for less than the company would pay if it were located in a more metropolitan area. The "quality of life" found in Utah was another advantage mentioned by the executives at Hart Scientific.

Utah has its disadvantages as well. Mr. Hunter expressed dissatisfaction with the local banking community several times. Although the company has a satisfactory relationship with a local bank at the present time, it took several years and many false starts before a bank could be found that was willing to help. According to the CEO, this situation was not only frustrating, it was almost fatal.

Megahertz Corporation

Background

Megahertz Corporation exemplifies the trials and successes of an emerging high tech firm. Founded in 1985, this Salt Lake City-based computer peripheral company was launched by two co-founders (David Spafford and Keith Thompson) who developed, financed, and marketed a "Turboswitch". From these humble beginnings, Megahertz has increased its sales, revenues, and employment in the past four years. Moreover, the company has expanded its product line to include an array of memory/modem peripherals for laptop personal computers and has gained industry-wide recognition. Despite these successes, Megahertz faces new challenges: increasing competition, a need for new products, and of course, ongoing financial concerns. Spencer Kirk is the company's President and CEO. Keith Thompson is no longer employed at Megahertz.

Products

The turboswitch was the company's first commercial product. This peripheral boosts the response time or speed of a personal computer and was an instant success. Within the first six months, the company sold almost 1,000 turboswitches. At a production cost of just $20 per switch and a retail price of $150, the turboswitch provided healthy margins and profits for the fledgling company. This success encouraged the founders to formalize their operations and incorporate. After launching Megahertz, the founders realized that although the Turboswitch was very successful, competition would eventually erode this market (and the firm's position in that market) unless additional products were developed.

Within 18 months after producing the first switch, Megahertz merged with Vector Development.

This merger accomplished several objectives. First, almost immediately Megahertz was able to expand its product line since Vector had already developed modem technology; second, the company was publicly-traded, so as a result of the merger Megahertz became a traded entity. (It should be noted that the company has since gone private.) Finally, the merger opened a door for Megahertz and it was quick to take advantage of the opportunity. The following year (1987) sales jumped to $3 million, although some of this gain was due to extraordinary circumstances. During the critical two-year period, 1985 to 1987, Megahertz was almost entirely internally-funded. Sales from the Turboswitch and the modems allowed the company to expand.

The company has since developed an array of modems and memory cards for Toshiba, Compaq, Sharp, Sanyo, Zenith, NEC, and Epson. All Megahertz products support industry standard protocols for complete compatibility. These modems support both U.S. and International Standards, as well as the full Hayes "AT" command set. The firm's 3720 emulation cards support both IRMA and IBM applications. The modems are packages with software for "plug-and-play" right out of the box.

Megahertz manufactures a complete line of modems and memory cards for laptop computers. The EasyTalk T1200 and EMS/T1200 are representative of the types of products developed by the company. The EasyTalk EMS/T1200 is a multi-function board which is compatible with a Toshiba laptop. This peripheral provides one megabyte of memory and a 1200/300 baud internal modem, which allows the user to fully utilize the power of integrated software programs like 1-2-3, Symphony, Framework, and Desqview. The EasyTalk T1200 internal board modems for the Toshiba laptop computers allows the user to be in touch with the office, sending and receiving data without a hitch. Other features such as auto-answer and auto-dial make EasyTalk modems a very competitive peripheral.

The Megahertz product line includes eight separate peripherals (modems, connectivity cards, and memory cards) for Toshiba; two modems for Compaq; two modems for Zenith; two modems for NEC; and one modem each for Epson, Sharp, and Sanyo. Prices for these peripherals range between $999 for EMS memory modem cards for Toshiba and $249 for the Zenith 1200 baud modem.

As evidenced by this price structure, Megahertz competes in a very price sensitive industry. In order to maintain a competitive advantage, Megahertz has developed a cost-efficient production system. All the electronic components for the peripherals are brought to the company where they are "kitted". The kits are then sent to manufacturers located in Salt Lake County to be assembled. Megahertz contracts with four manufacturers for this work. After assembly the modems are returned to Megahertz for testing and shipping. This arrangement reduces the company's labor costs and fixed capital investment requirements, which in turn, makes the company more competitive. This is an important reason why the company has succeeded.

Funding

Megahertz was a bootstrap start-up. David Spafford and Keith Thompson provided the initial start-up capital. The company was fortunate that sales from the Turboswitch provided an immediate cash flow in its seed phase. However, even with sales and healthy margins, financing the company was very difficult and required investments by other principals.

Initially, the company's reliance on internal funding created an acute awareness of cash flow and of the need to minimize costs and expenses. For example, all shipments were sent C.O.D. Receivables, especially a large receivable account, can create severe cash problems for a young firm. Megahertz avoids this problem through C.O.D. billing. Megahertz also reduces its fixed capital requirements by contracting with other firms to assemble its products. In addition to reducing labor costs and associated capital costs, this practice allows the firm to invest in equipment which can be used for testing and quality control.

It is not surprising that after several successful years, venture capital investors would notice Megahertz. In fact, the company has been approached by local venture investors. The company's response to this overture was less than enthusiastic. Management feels that the price of venture investments are far too high. The founders and other equity holders did not want to give up a large percentage of the company and perhaps management control as well. After weighing the alternatives, they decided that slower growth funded through cash flow was the best policy for Megahertz.

Market Potential

Megahertz designs and manufactures peripherals for the laptop computer market. According to Mr. Kirk, laptop computers are a rapidly growing segment of the personal computer market and demand for this product is expected to outpace demand for the desktop personal computer. "Portability is preferred" especially when there is no noticeable reduction in capacity. Sales of laptop models account for 17 percent of all computer sales. The market is expanding at an annual rate of 70 percent. Clearly, this level of expansion will taper; however, the laptop segment will continue to expand and with it, the company's market. The challenge for Megahertz is to develop products at a pace that matches market growth without compromising quality. In response to this challenge, the company has introduced six new peripheral products since June 1988 and has four additional products on the drawing board.

Management and Employment

Spencer Kirk is both President and CEO of Megahertz. Mr. Kirk was educated at the University of Utah, and has an MBA. His contribution to the partnership was a strong background in finance and marketing, although prior to forming Megahertz he had very limited practical business experience. Dave Spafford is the Vice President of Marketing and also holds an equity position in the company.

As a small growing company, the management style at Megahertz is best described as "hands-on". The executives are very familiar with the overall operations of the company as well as each individual specialty. This style encourages interplay between the executives and, more importantly, facilitates a quick response to customer's needs. Management has deliberately kept the structure simple and responsible. This fits their overall business philosophy of minimizing expenses without compromising response time. Megahertz is enjoying tremendous growth. At issue is whether the present executive core can shepherd the company to the next plateau.

Megahertz employs 24 people. Four of these employees have technical backgrounds in electrical engineering and four are employed in the company's newly established in-house telemarketing program. Part-time employees are used as needed. Megahertz has had little problem finding qualified people. Moreover, according to the company's CEO, turnover within the company is very low.

Utah: An Executive Opinion

In recent months, the founders of Megahertz explored the feasibility of relocating to Texas. While they elected to remain in Salt Lake, this exercise reconfirmed to them the disadvantages of operating a business in Utah. According to one of the company's executives, "The differences between city officials and bankers in Austin, Texas and Salt Lake were like night and day." Austin city officials rolled out the red carpet when Megahertz visited the city. The Chamber of Commerce arranged a tour of the city, meetings with real estate brokers and bankers. The Chamber also arranged several meetings between the executives and vendors and founders of high tech companies located in Austin. The visit to Austin and the responsiveness and of city officials left a very positive impact on the founders of Megahertz. But, the company elected to remain in Utah. Why?

There are many reasons: first, the founders are from Salt Lake. They like the state and its culture. Second, the quality of labor in the local market is exceptional. Third, the company has excellent working relationships with its vendors, suppliers and manufacturers. So, while Austin was attractive for many reasons, the founders opted to remain in the state. Nevertheless, this victory for the local economy should not cloud the issues facing the state and start-up companies.

One of these issues involves the banking community. The CEO of Megahertz expressed some very definite opinions concerning Utah banks. He feels that local banks have not helped his company even though the company has shown impressive gains. Megahertz has been unable to secure short term financing and, according to the CEO, local banks either do not understand or are unwilling to address the special needs of a small, start-up company like Megahertz. He went on to say in an interview that other executives agree with his assessments.

For Megahertz, the primary "Utah" issues are shortcomings in the economic environment. The market is not meeting their needs, and perhaps the needs of dozens of similar companies. Unless there is a change, other companies will be looking and moving elsewhere.

TheraTech, Inc.

Background

Founded in 1985, TheraTech, Inc. (TTI) has emerged as one of Utah's fastest growing pharmaceutical companies with the development of controlled-release drug delivery systems. Like many companies located in the University of Utah Research Park, TTI maintains strong ties with the University of Utah. Two of the company's founders are faculty members at the University. Dr. William Higuchi is a Distinguished Professor and Chairman in the Department of Pharmaceutics, and Dr. Sung Wan Kim is a Professor of Pharmaceutics and Adjunct Professor of Bioengineering, and is the Director of the Center for Controlled Chemical Delivery. Both founders serve on the Board of Directors of TTI, as well as serving in their academic positions at the university. Dr. Dinesh Patel is the third founder of the company. He is also President and CEO of the company.

Products

Controlled-release technology has rapidly emerged over the past decade as a new interdisciplinary science offering significant therapeutic advantages over conventional pharmaceutical dosage forms. The basic concept behind controlled drug delivery lies in the fundamental dose-response properties of each therapeutic agent. As the drug enters the body, it first appears in the circulating blood from which it then distributes to the eventual site(s) of biological action. These end-point pharmacological effects are dependent upon the level of the drug in the circulating blood. At a certain level, the drug produces the desired pharmacological effect, while toxic side effects or no effects are encountered at levels either above or below (respectively) the effective level. The effective drug level in the blood may be constant over time, or may be a complex temporal pattern depending upon the drug—each drug is different.

The level of a drug in the blood represents a dynamic balance between the rate at which the drug is eliminated from the body (by metabolism, excretion, etc.), and the rate at which the drug is delivered into the body. The goal of controlled drug release technology is to provide the effective blood level profile by providing the necessary drug delivery rate profile to the body, optimizing therapeutic efficacy while minimizing deleterious side effects.

TTI is active in virtually all areas of drug delivery research, including drug targeting, drug carrier research, and biodegradable polymer research. However, near term product development activities are focused on transdermal and oral drug delivery. Transdermal drug delivery involves administering therapeutic agents at desired rates through the skin. Due to the inherent barrier properties of skin, few drugs can be delivered transdermally at therapeutically effective rates based on the intrinsic permeabilities of the drugs. TTI has, therefore, developed multicomponent permeation enhancers, agents which increase the permeability properties of drugs through skin. By delivering these drugs transdermally, the effective blood level of the drug can be maintained for extended durations.

Theratech's enhancer technology can be tailored to numerous drugs for transdermal administration. The company has also developed trandsermal system designs specific for these enhancers, providing stable transdermal dosage forms that are applied directly to the skin. There are presently five transdermal products in clinical development at the company. The company is also pursuing new oral delivery systems for drug administration in the gastrointestinal tract.

Funding

TTI was a bootstrap company. The three founders of the company contributed the initial capital. Unlike many start-up companies, TTI had several advantages which helped the company obtain new funding. The most important advantage is the reputation and expertise of the founders. Dr. Higuchi has been active in the development and research of drug delivery systems for over 25 years. During this time, he has acted as a consultant to many major pharmaceutical companies and has published over 250 articles and research papers dealing with drug delivery systems.

Dr. Kim has done pioneering work in the areas of thrombus formation on polymer surfaces and hydrogel drug delivery systems. He has published over 150 articles and research papers on these topics, as well as edited three books on advances in drug delivery systems. While at Alcon Laboratories, Dr. Patel (president and CEO of the company) led a research team that was responsible for the development of new delivery systems and optimizing ocular and topical dosage forms.

It is hardly surprising that major pharmaceutical companies wanted to be involved with this new company headed by such illustrious researchers. Soon after TTI was formally established, the founders entered into research and development agreements to develop transdermal products for a Japanese company and a Korean company. These agreements represented a second round of financing for the firm. With these in place, TTI had sufficient capital for the short run. The third major round of financing was an equity investment made a U.S. pharmaceutical company for 10 percent of TTI.

Because of its success in attracting corporate investors and its ability to contract its research expertise, TTI has avoided many of the capital problems that beset other start-up firms. In fact, as reported by the president of the company, "investment capital is not a problem". The company is considering another 10 percent equity sell to a second pharmaceutical company and is negotiating several research and development partnerships in which TTI would not only develop selected products but also would share in the financial success of these products through royalty streams on the finished product.

TTI has been approached by several venture firms. However, the company is not interested in pursuing such capital at present. Investments made by corporations and a lucrative R&D business ($1.25 million annually) meets the firm's capital needs. Furthermore, the price of venture capital is simply too high.

However, the company will have to investigate other avenues if it wishes to continue its rapid growth. Over the past three years, the company has confined its efforts to the research and development of three or four products. The next phase of growth includes the development of manufacturing and marketing capabilities. Ultimately, TTI hopes to become a fully integrated pharmaceutical company. Such plans require a substantial capital investment. The firm is considering a public offering as soon as enough products are ready for market. Until that time, TTI will continue to rely on research contracts and equity investments to generate revenue.

Market Potential

In just five years and with the development of only five transdermal drugs, the market for this type of delivery system has exploded to over $500 million. Each time a drug can be administered through this system, the market expands even more. For example, when nitrogyclerine was administered through a tiny pill, the market was around $40 million. After the development of the patch the market for the same drug for the same use, skyrocketed to $200 million. If this example is multiplied by the number of potential drugs which are adaptable to this delivery system, the market potential expands exponentially. According to Dr. Patel, TTI ranks in the top five companies involved in drug delivery systems of this type. Alza, Inc., and CIBA-Geigy, Inc. are major competitors; however, TTI has a competitive advantage because of its proprietary enhancer technology.

Management and Employment

TTI's management structure is very simple. Dr. Patel is the President and CEO. Dr. Higuchi is Chairman of the Board, and Dr. Kim is a member of the Board of Directors. Currently, the financial matters are managed by a comptroller who reports to the president. Dr. Ebert is responsible for the R&D efforts of the company. Dr. Ebert has over six years experience in the development of advanced drug delivery systems. At one time he headed the systems development group at CIBA-Geigy, one of TTI's chief competitors.

When the firm began in 1985, the only full-time employee was Dr. Patel. Presently, TTI employs 30 professionals and staff personnel. Another three researchers will join the firm within the year. The company has not had difficulty filling entry-level research or staff positions. One reason may be that TTI offers very competitive salaries. As Dr. Patel explained, TTI must offer salaries that can attract preeminent researchers. While these salaries are higher than those offered by other companies in Utah, it is worth the additional dollars to get the right people. The company does use University of Utah graduate students as research assistants. Dr. Patel reports that the company has very low employee turnover. He attributes this to the type of research being conducted at the company and the firm's hiring practices.

Utah: An Executive Opinion

TTI intends to become a major, fully-integrated pharmaceutical company. One of the questions asked by management is whether or not Utah is the ideal location for such ambitious plans. The verdict is still out. Although it is difficult to persuade experienced pharmaceutical researchers to relocate in Utah, TheraTech has been successful in recruiting top-flight researchers. As the company grows, its need for experienced researchers will be much greater than it is at present. Management is concerned that recruitment may be a bottleneck in its development.

As TTI has not had to use venture capital, Dr. Patel, unlike other presidents of emerging companies, has had minimal interaction with the venture capital community. To date, the president has been satisfied with the services provided by local banks. Undoubtedly, these issues will be more pressing when the company launches its expansion.

Nevertheless, for the founders the advantages of Utah far outweigh the recruitment problems. The president readily acknowledges that without the University of Utah, TTI would not have grown at such a rapid pace. The company's founders are still faculty members at the University. Moreover, the company's proximity to the campus, the availability of graduate students and new researchers, and technical resources, have all contributed to the firm's success. For these reasons, as well as the founders' preference to remain in Utah, TTI will likely stay, at least for the short term.

ADDENDUM

The following addendum is included to clarify the early history of Novell, Inc. as reported in the *Utah Economic and Business Review,* Vol. 49, Number 2 (February 1989). This additional history and information has been provided by Jack Davis who currently serves as Vice President of Corporate Development at Icon International, Inc. located in Orem, Utah. Mr. Davis is one of Icon's founders.

The roots of Novell, Inc. can be traced back to 1979 when Jack Davis (one of the original founders) first heard about the newly developed Motorola 68000 microprocessor chip. As information about this product became more readily available, Davis began considering the possibility of developing a computer system that could take advantage of powerful capabilities of the 68000 microprocessor chip. By the middle of 1979, Davis had put together a business plan for his new venture, and contacted a former acquaintance, George Canova, asking him to review and critique the plan.

Davis and Canova knew each other from their days together at Century Data. Century Data was a company founded by George Canova and acquired by Cal Comp, a company for which Davis worked. Davis and Canova worked together for about a year after the acquisition before Davis left and went to work for General Automation. As Canova was the founder of a successful high tech company, Davis felt Canova's insights would be valuable in developing a business plan that was attractive to venture investors. Rather than critique the business plan, Canova was so impressed with the product concept that he agreed to invest $250,000 in the new company with the understanding that he would secure all additional financing. This was agreeable to Davis, and Novell Data Systems, Inc. (NDSI) was formed in August 1980.

Canova made an initial investment of $100,000 in NDSI and became President of the company. Davis was the Executive Vice President responsible for marketing, terminal development, and new product planning. Although Canova had agreed to secure follow-on financing for NDSI, he was unable to do so. After several unfruitful attempts, Canova informed Davis that he was unwilling to invest any more of his money into the venture unless new financing was secured. At this point Davis called on a former client, Victor Virpole, who was working for a company called Safeguard Business Systems (later it became Safeguard Scientifics, Inc.). Virpole convinced his boss, Pete Muesser, that the concept was a sound one that would be worth pursuing. Soon after, Davis and Canova flew to Philadelphia and made their presentation. That day, Safeguard agreed to provide $1.8 million in venture capital and wrote Davis a check for $180,000, Canova put in another $100,000 and the company was off and running.

The original product concept, as described in NDSI's business plan, was the development of a high-speed, multiprocessor, multiuser computer system that used the Motorola 68000 chip. This was to be the company's primary product. SuperSet, a software development consulting group, was hired to develop a word processor for the system. In addition to the 68000 computer system, the company was also developing another product known as a Universal Terminal that Davis had brought with him from Terminal Specialties, a company of which he founded and worked for prior to the formation of NDSI.

Internal problems at NDSI began when Davis and Canova were unable to reconcile their differences as to the focus of the company's development efforts. Canova wanted to develop and market a product quickly in order to generate enough money to offset development costs. Davis wanted to continue development of the computer system. However, Canova was President, so despite Davis' objections, he elected to take the Universal Terminal, make minor modifications and turn it into a personal computer system. Unfortunately, this new system turned out to be another "me too" computer system that did not perform as well as other products on the market. Not only was it an expensive product, it was extremely slow. As a possible solution to the problem, Davis and Canova decided to network the system. SuperSet's efforts were then redirected from writing a word processing program to the development of a networking system. By this time, all development on the 68000 computer system had come to a halt; however, the development work that had been completed was soon put to use.

In designing the network, SuperSet tried to use the terminal computer as a disk server but found it was not powerful enough to do the job. To overcome this problem, they took the one completed board of the 68000 computer system and used it for a server. (That product, with only minor changes in its implementation became the server that Novell sold for a long time as the 68B.)

As development progressed on the personal computer system, tensions between Davis and Canova grew to the point that Canova asked Davis to leave the company. Safeguard was unwilling to intercede, and stood behind Canova's decision. Three months later, Safeguard fired Canova as well. For the next year, Safeguard tried to sell the company. Several offers were made, but each one failed. Finally, Davis, hoping to save what was left of his investment in Novell, contacted Safeguard and asked them to talk with Raymond Noorda. Davis and Noorda had worked together at General Automation prior to the time that Davis founded Terminal Specialties. Noorda had a long history of taking sick companies and making them successful. In desperation, Safeguard contacted Noorda, and in 1983, he agreed to take over as President and co-founder of Novell, Inc.

Utah Business Statistics

UTAH DATA	Feb. 1988	Feb. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,535	NA	NA	NA	19,202	NA
New Corporations (no.)	516	338	-34.5%	452	470	3.9%
New Car, Truck and Motor Home Sales (no.)	5,572	4,339	-22.1%	5,110	5,027	1.7%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	66.90	74.00	10.6%	69.42	64.57	7.5%
Lambs (cwt)	77.80	60.20	-22.6%	60.76	73.68	-17.5%
Milk Wholesale (cwt)	11.80	12.30	4.2%	11.74	11.86	-1.0%
Alfalfa Hay, Baled (per ton)	74.00	86.00	16.2%	77.42	68.58	12.9%
Cattle Slaughtered (live weight) (thous. of lbs.)	45,368	44,779	-1.3%	46,666	42,944	8.7%
Construction						
Total Construction (thous. of dol.) 1	111,567	64,728	-42.0%	114,011	119,625	-4.7%
Residential	28,619	24,775	13.4%	46,454	47,511	-2.2%
Nonresidential	44,614	32,509	27.1%	38,553	41,537	-7.2%
Public Works and Utilities	38,334	7,444	-80.6%	29,039	30,575	-5.0%
Total Permit Construction (thous. of dol.) 2	55,590.0	51,264.3	-7.8%	71,389.7	86,574.4	-17.5%
Residential	27,284.0	20,802.6	-23.8%	34,118.8	40,055.0	-14.8%
Nonresidential	16,996.5	24,375.7	43.4%	23,980.9	32,881.1	-27.1%
Additions, Alterations, and Repairs	11,309.5	6,086.0	-46.2%	13,290.0	13,638.3	-2.6%
New Dwelling Units (no.)	406	283	-30.3%	466	586	-20.4%
Employment						
Civilian Labor Force (thous.)	743.7	765.3	2.9%	760.2	755.0	0.7%
Total Employed Persons	698.2	729.3	4.5%	725.0	709.6	2.2%
Unemployed Persons	45.5	36.0	-20.9%	35.2	45.4	-22.4%
Percent Total Labor Force	6.1	4.7	-23.0%	4.6	6.0	-23.0%
Employees on Nonagricultural Payrolls (thous. of jobs)	639.9	665.4	4.0%	661.0	642.4	2.9%
Manufacturing	94.9	101.0	6.4%	98.5	93.5	5.3%
Mining	8.3	7.6	-8.4%	8.2	8.1	0.8%
Contract Construction	20.5	20.6	0.5%	24.5	26.1	-6.1%
Transportation, Communication, and Utilities	37.8	39.8	5.3%	39.6	38.0	4.2%
Wholesale Trade	34.5	35.8	3.8%	35.0	34.8	0.5%
Retail Trade	115.3	120.3	4.3%	120.7	118.0	2.3%
Finance, Insurance, and Real Estate	33.5	32.9	-1.8%	33.4	33.7	-1.0%
Services 3	151.3	161.2	6.5%	158.5	148.3	6.9%
Federal Government	39.1	39.3	0.5%	39.5	39.7	-0.6%
State Government 4	39.5	40.2	1.8%	38.3	38.0	0.7%
Local Government 4	65.3	66.7	2.1%	65.0	64.0	1.6%
Average Weekly Hours						
Manufacturing	39.9	39.5	-1.0%	40.6	39.9	1.7%
Mining	43.0	40.9	-4.9%	41.6	41.6	0.0%
Wholesale Trade	38.7	34.9	-9.8%	37.0	38.1	-3.1%
Retail Trade	27.6	26.2	-5.1%	27.9	28.2	-0.9%
Amount of Unemployment Compensation (thous. of dol.)	8,993.5	7,474.6	-16.9%	5,677.9	7,253.1	-21.7%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,088.9	2,243.1	7.4%	2,363.5	2,411.2	2.0%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	275,699.4	248,733.9	-9.8%	149,315.0	143,385.2	4.1%
Sales and Use Tax	137,158.9	129,837.1	-5.3%	54,614.9	48,776.7	12.0%
Motor Fuel Tax	9,983.1	9,947.8	-0.4%	10,948.1	9,834.5	11.3%
Individual Income Tax	74,745.1	65,792.2	-12.0%	54,004.1	50,046.8	7.9%
Corporation Franchise Tax	1,175.8	(491.0)	-141.8%	6,507.5	7,250.2	-10.2%
Production						
Net Electric Power Utilized (mil. of kwh)	1,114.7	NA	NA	NA	1,157.6	NA
Crude Oil to Refineries (thous. of bbls.)	3,484.7	3,900.6	11.9%	4,347.3	3,785.6	14.8%
Crude Oil (thous. of bbls.)	2,745.0	2,246.5	-18.2%	2,680.4	2,921.8	-8.3%
Natural Gas (mil. of cu. ft.)	23,646.5	22,506.3	-4.8%	23,017.1	22,114.6	4.1%
Coal (thous. short tons)	1,649.0	1,356.0	-17.8%	1,472.7	1,394.7	5.6%
Tourism/Travel						
Air Passengers (total no. on and off) (S.L. Int'l Airport)	802,631	870,317	8.4%	881,441	849,691	3.7%
Highway Traffic Count Across State Lines	NA	29,321	NA	NA	NA	NA
Transient Room Taxes (thous. of dol.)	(175.6)	1,225.7	-798.0%	644.0	362.9	77.5%
Visits, State, Nat'l. Parks, Monuments (thous.)	345.4	263.9	-23.6%	1,093.5	1,066.0	2.6%
Utilities						
Telephone Lines in Service (Mt. Bell)(Residential)	486,615	497,063	2.1%	490,260	481,313	1.9%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	178,484	184,235	3.2%	181,962	176,696	3.0%
Electric Customers (Residential)	477,257	483,845	1.4%	477,755	474,058	0.8%
Electric Customers (Commercial)	46,468	48,006	3.3%	47,057	46,343	1.5%
Natural Gas Customers (Residential & Commercial)	462,050	472,690	2.3%	461,027	448,734	2.7%
Natural Gas Customers (Industrial)	543	554	2.0%	551	552	-0.2%

Utah Business Statistics

UTAH DATA	Feb. 1988	Feb. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	50.1r	52.0f	3.8%	52.7	52.0	1.4%
Unemployment Rate	5.4r	3.3	-38.9%	4.0	5.3	-23.8%
Auth. Permit Construction (thous. of dol.)	7,029.2	4,510.3	-35.8%	8,996.9	12,453.7	-27.8%
New Dwelling Units (no.)	55	34	-38.2%	67	87	-23.3%
Postal Receipts (thous. of dol.)	401.7	645.6	60.7%	458.8	385.8	18.9%
Electric Customers (Residential)	48,142	47,816	-0.7%	48,171	47,530	1.3%
Electric Customers (Commercial)	3,362	3,574	6.3%	3,500	3,309	5.8%
Natural Gas Customers (Residential)	50,372	51,808	2.9%	50,643	49,087	3.2%
Natural Gas Customers (Industrial)	53	54	1.9%	53	52	1.9%
Telephone Lines in Service (Mt. Bell)(Residential)	54,849	56,209	2.5%	55,570	54,860	1.3%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	10,990	11,742	6.8%	11,459	10,680	7.3%
Salt Lake County						
Non-Ag. Employment (thous.)	331.2r	343.1f	3.6%	341.5	333.7	2.4%
Unemployment Rate	5.5r	3.7	32.7%	4.2	5.5	-22.6%
Auth. Permit Construction (thous. of dol.)	21,767.3	31,805.0	46.1%	31,371.4	39,221.7	-20.0%
New Dwelling Units (no.)	140	130	-7.1%	179	219	-18.4%
Postal Receipts (thous. of dol.)	7,525.4	8,690.3	15.5%	8,151.8	7,350.0	10.9%
Electric Customers (Residential)	240,036	244,072	1.7%	240,361	236,948	1.4%
Electric Customers (Commercial)	20,234	21,020	3.9%	20,516	20,026	2.4%
Natural Gas Customers (Residential)	223,119	225,883	1.2%	221,345	217,761	1.6%
Natural Gas Customers (Industrial)	231	236	2.2%	237	238	0.1%
Telephone Lines in Service (Mt. Bell)(Residential)	229,184	233,418	1.8%	230,953	227,453	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,053	111,864	1.6%	111,305	110,018	1.2%
Utah County						
Non-Ag. Employment (thous.)	77.7r	83.0f	6.8%	78.4	75.3	4.1%
Unemployment Rate	5.7r	3.0	-47.4%	3.9	6.4	-38.9%
Auth. Permit Construction (thous. of dol.)	12,070.6	5,681.1	-52.9%	10,709.6	12,492.0	-14.3%
New Dwelling Units (no.)	88	52	-40.9%	64	93	30.6%
Postal Receipts (thous. of dol.)	1,082.8	1,369.2	26.4%	1,249.5	942.7	32.5%
Electric Customers (Residential)	51,740	52,699	1.9%	52,486	52,291	0.4%
Electric Customers (Commercial)	5,907	5,950	0.7%	5,984	6,207	-3.6%
Natural Gas Customers (Residential)	62,176	63,263	1.7%	61,962	60,500	2.4%
Natural Gas Customers-(Industrial)	70	74	5.7%	69	69	0.7%
Telephone Lines in Service (Mt. Bell)(Residential)	64,672	66,447	2.7%	64,971	62,751	3.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,766	21,185	7.2%	20,391	19,021	7.2%
Weber County						
Non-Ag. Employment (thous.)	60.4r	62.9f	4.1%	61.8	60.4	2.3%
Unemployment Rate	6.8r	4.4	-35.3%	5.2	7.1	-26.4%
Auth. Permit Construction (thous. of dol.)	4,649.3	1,860.7	60.0%	5,276.8	7,776.3	-32.1%
New Dwelling Units (no.)	42	14	-66.7%	44	65	-31.7%
Postal Receipts (thous. of dol.)	684.0	664.2	-2.9%	680.3	620.4	9.7%
Electric Customers (Residential)	53,547	54,419	1.6%	53,641	52,976	1.3%
Electric Customers (Commercial)	4,896	4,980	1.7%	4,939	4,867	1.5%
Natural Gas Customers (Residential)	50,230	50,922	1.4%	49,936	49,104	1.7%
Natural Gas Customers (Industrial)	83	80	-3.6%	83	85	-2.3%
Telephone Lines in Service (Mt. Bell)(Residential)	46,112	47,049	2.0%	46,643	46,017	1.4%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,341	12,093	6.6%	12,005	11,144	7.7%

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1 Obtained from F.W. Dodge Statistics.
2 Obtained from *Utah Construction Report*.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

NA Not Available
r Revised
f Forecast

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Secretary of State.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, *Utah Agriculture*.
Construction Data	F.W. Dodge Statistics and Bureau of Economic and Business Research, *Utah Construction Report*.
Employment Data	Utah Department of Employment Security.
Savings Information	Utah Savings and Loan Institutions.
Tax Collections	Utah State Tax Commission.
Net Electric Power Utilized	Cooperating Utah Power Companies.
Crude Oil Production	Area Oil Refineries.
Natural Gas Production	Utah Department of Oil, Gas, and Mining.
Coal Production	U.S. Department of Energy.
Air Passengers	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count	Utah Department of Transportation.
Visits to State and National Parks and Monuments	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utah Utility Companies.
Postal Receipts	Postmasters in Davis, Salt Lake, Utah and Weber Counties.

Utah Business Statistics

UTAH DATA	Mar. 1988	Mar. 1989	% Change from Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	19,535	NA	NA	NA	19,289	NA
New Corporations (no.)	547	528	-3.5%	450	473	-4.7%
New Car, Truck, and Motor Home Sales (no.)	5,326	5,290	-0.7%	5,107	5,204	-1.9%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	68.70	74.40	8.3%	69.89	65.13	7.3%
Lambs (cwt)	64.30	64.70	0.6%	60.79	72.78	-16.5%
Milk Wholesale (cwt)	11.50	11.80	2.6%	11.77	11.82	-0.4%
Alfalfa Hay, Baled (per ton)	75.00	87.00	16.0%	78.42	69.33	13.1%
Cattle Slaughtered (live weight) (thous. of lbs.)	48,334	51,829	7.2%	46,957	43,681	7.5%
Construction						
Total Construction (thous. of dol.) 1	98,916	145,820	47.4%	117,356	118,458	-0.9%
Residential	45,652	55,859	22.4%	46,651	46,735	-0.2%
Nonresidential	41,809	59,149	41.5%	40,089	42,658	-6.0%
Public Works and Utilities	11,455	30,812	169.0%	30,652	29,065	5.5%
Total Permit Construction (thous. of dol.) 2	75,864.9	99,218.4	30.8%	73,335.9	82,214.5	-10.8%
Residential	38,080.0	39,580.1	3.9%	34,243.8	38,797.9	-11.7%
Nonresidential	26,343.0	41,781.5	58.6%	25,267.5	29,777.7	-15.1%
Additions, Alterations, and Repairs	11,441.9	17,856.8	56.1%	13,824.6	13,639.0	1.4%
New Dwelling Units (no.)	506	549	8.5%	470	558	-15.7%
Employment						
Civilian Labor Force (thous.)	745.2	765.1	2.7%	760.6	754.3	0.8%
Total Employed Persons	701.5	728.1	3.8%	726.0	709.9	2.3%
Unemployed Persons	43.7	37.0	-15.3%	34.6	44.4	-22.0%
Percent Total Labor Force	5.9	4.8	-18.6%	4.6	5.9	-22.7%
Employees on Nonagricultural Payrolls (thous. of jobs)	646.4	671.4	3.9%	663.3	643.6	3.1%
Manufacturing	95.3	100.3	5.2%	98.9	93.9	5.3%
Mining	8.3	7.6	-8.4%	8.1	8.2	-0.7%
Contract Construction	21.4	21.7	1.4%	24.5	25.8	-4.8%
Transportation, Communication, and Utilities	38.1	39.3	3.1%	39.7	38.0	4.3%
Wholesale Trade	34.8	37.0	6.3%	35.2	34.8	1.2%
Retail Trade	117.0	121.4	3.8%	121.2	118.1	2.6%
Finance, Insurance, and Real Estate	33.5	33.2	-0.9%	33.4	33.7	-1.0%
Services 3	153.4	163.4	6.5%	159.4	149.1	6.9%
Federal Government	39.3	39.9	1.5%	39.5	39.6	-0.3%
State Government 4	39.1	40.1	2.6%	38.4	38.0	1.1%
Local Government 4	66.2	67.5	2.0%	65.1	64.1	1.7%
Average Weekly Hours						
Manufacturing	39.7	39.3	-1.0%	40.5	39.9	1.4%
Mining	43.6	40.0	-8.3%	41.3	41.9	-1.3%
Wholesale Trade	38.5	36.4	-5.5%	36.8	38.2	-3.8%
Retail Trade	27.8	26.6	-4.3%	27.8	28.1	-1.2%
Amount of Unemployment Compensation (thous. of dol.)	9,606.8	7,376.5	-23.2%	5,492.1	7,027.1	-21.8%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,107.4	2,227.8	5.7%	2,373.5	2,381.7	-0.3%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	70,014.8	54,763.9	-21.8%	148,044.1	144,183.2	2.7%
Sales and Use Tax	7,481.1	2,323.9	-68.9%	54,185.1	49,150.4	10.2%
Motor Fuel Tax	10,566.4	10,238.3	-3.1%	10,920.7	10,107.7	8.0%
Individual Income Tax	32,681.3	14,442.9	-55.8%	52,484.2	51,021.1	2.9%
Corporation Franchise Tax	1,493.7	7,049.2	371.9%	6,970.5	6,955.5	0.2%
Production						
Net Electric Power Utilized (mil. of kwh)	1,232.9	NA	NA	NA	1,166.0	NA
Crude Oil to Refineries (thous. of bbls.)	3,599.0	3,829.5	6.4%	4,366.5	3,786.3	15.3%
Crude Oil (thous. of bbls.)	2,864.1	2,469.4	-13.8%	2,647.5	2,923.5	-9.4%
Natural Gas (mil. of cu. ft.)	22,661.5	23,314.4	2.9%	23,071.5	22,379.7	3.1%
Coal (thous. short tons)	1,716.0	1,671.0	-2.6%	1,468.9	1,461.8	0.5%
Tourism/Travel						
Air Passengers (total no. on and off)(S.L. Int'l Airport)	964,406	1,076,602	11.6%	890,791	848,112	5.0%
Highway Traffic Count Across State Lines	NA	36,322	NA	NA	NA	NA
Transient Room Taxes (thous. of dol.)	2,090.2	(34.7)	-101.7%	466.9	574.5	-18.7%
Visits, State, Nat'l. Parks, Monuments (thous.)	485.7	607.5	25.1%	1,103.6	1,072.1	2.9%
Utilities						
Telephone Lines in Service (Mt. Bell)(Residential)	486,879	497,699	2.2%	491,161	481,991	1.9%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	179,376	184,692	3.0%	182,405	177,128	3.0%
Electric Customers (Residential)	476,830	484,142	1.5%	478,365	474,450	0.8%
Electric Customers (Commercial)	46,598	48,023	3.1%	47,176	46,367	1.7%
Natural Gas Customers (Residential & Commercial)	461,877	474,693	2.8%	462,095	449,686	2.8%
Natural Gas Customers (Industrial)	543	559	2.9%	553	551	0.2%

Utah Business Statistics

UTAH DATA	Mar. 1988	Mar. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	51.0r	52.5f	2.9%	52.9	51.9	1.7%
Unemployment Rate	5.1r	3.8	-25.5%	4.0	5.2	-24.6%
Auth. Permit Construction (thous. of dol.)	9,562.1	8,239.5	-13.8%	8,886.7	10,007.2	-11.2%
New Dwelling Units (no.)	78	72	-7.7%	66	84	-21.3%
Postal Receipts (thous. of dol.)	384.6	574.2	49.3%	474.6	385.5	23.1%
Electric Customers (Residential)	48,050	49,201	2.4%	48,267	47,609	1.4%
Electric Customers (Commercial)	3,384	3,599	6.4%	3,518	3,320	6.0%
Natural Gas Customers (Residential)	50,312	52,029	3.4%	50,786	49,202	3.2%
Natural Gas Customers (Industrial)	52	55	5.8%	53	52	2.4%
Telephone Lines in Service (Mt. Bell)(Residential)	54,929	56,414	2.7%	55,694	54,895	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,156	11,754	5.4%	11,509	10,740	7.2%
Salt Lake County						
Non-Ag. Employment (thous.)	334.6r	345.9f	3.4%	342.5	334.1	2.5%
Unemployment Rate	5.5r	3.8	-30.9%	4.1	5.4	-24.2%
Auth. Permit Construction (thous. of dol.)	32,031.2	50,944.9	59.0%	32,947.5	37,195.8	-11.4%
New Dwelling Units (no.)	195	224	14.9%	181	205	-11.5%
Postal Receipts (thous. of dol.)	7,095.7	8,351.1	17.7%	8,256.4	7,360.3	12.2%
Electric Customers (Residenual)	240,138	243,498	1.4%	240,641	237,211	1.4%
Electric Customers (Commercial)	20,406	20,947	2.7%	20,561	20,069	2.5%
Natural Gas Customers (Residential)	223,141	226,642	1.6%	221,637	217,994	1.7%
Natural Gas Customers (Industrial)	233	237	1.7%	238	237	0.5%
Telephone Lines in Service (Mt. Bell)(Residential)	229,256	233,629	1.9%	231,317	227,731	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,285	112,158	1.7%	111,461	110,121	1.2%
Utah County						
Non-Ag. Employment (thous.)	78.9r	84.2f	6.7%	79.2	75.8	4.5%
Unemployment Rate	5.2r	3.4	-34.6%	3.8	6.2	-38.7%
Auth. Permit Construction (thous. of dol.)	12,914.9	17,400.5	34.7%	11,083.4	12,646.8	-12.4%
New Dwelling Units (no.)	62	97	56.5%	67	86	-21.7%
Postal Receipts (thous. of dol.)	1,026.8	1,415.2	37.8%	1,281.9	952.1	34.6%
Electric Customers (Residential)	51,815	52,670	1.7%	52,557	52,436	0.2%
Electric Customers (Commercial)	5,924	6,076	2.6%	5,997	6,167	-2.8%
Natural Gas Customers (Residential)	62,017	63,245	2.0%	62,064	60,615	2.4%
Natural Gas Customers (Industrial)	69	74	7.2%	69	69	1.1%
Telephone Lines in Service (Mt. Bell)(Residential)	64,690	66,507	2.8%	65,123	62,945	3.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,718	21,183	7.4%	20,513	19,123	7.3%
Weber County						
Non-Ag. Employment (thous.)	61.0r	63.6f	4.3%	62.0	60.4	2.5%
Unemployment Rate	6.4r	4.8	-25.0%	5.1	7.0	-27.8%
Auth. Permit Construction (thous. of dol.)	8,235.1	5,081.2	-38.3%	5,014.0	7,764.9	-35.4%
New Dwelling Units (no.)	58	46	-20.7%	43	63	-31.4%
Postal Receipts (thous. of dol.)	593.1	654.0	10.3%	685.4	613.5	11.7%
Electric Customers (Residential)	53,514	54,422	1.7%	53,716	53,034	1.3%
Electric Customers (Commercial)	4,931	5,092	3.3%	4,952	4,875	1.6%
Natural Gas Customers (Residential)	50,083	51,173	2.2%	50,027	49,157	1.8%
Natural Gas Customers (industrial)	83	83	0.0%	83	85	-2.2%
Telephone Lines in Service (Mt. Bell)(Residential)	46,209	47,150	2.0%	46,721	46,044	1.5%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,714	12,140	3.6%	12,040	11,209	7.4%

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1 Obtained from F.W. Dodge Statistics.
2 Obtained from *Utah Construction Report*.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

NA	Not Available
r	Revised
f	Forecast

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Secretary of State.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, *Utah Agriculture*.
Construction Data	F.W. Dodge Statistics and Bureau of Economic and Business Research, *Utah Construction Report*.
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NATIONAL DATA	Mar. 1988	Mar. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,724.5	5,116.8	8.3%	4,962.3	4,609.9	7.6%
Total Personal Income (seasonally adjusted) (bil. of dol.)	3,985.9	4,349.7	9.1%	4,152.3	3,848.9	7.9%
Industrial Production Indexes (seasonally adjusted) (1977=100)	134.7	141.0	4.7%	138.8	131.7	5.4%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	412.0	465.5	13.0%	443.0	397.4	11.5%
Index of Leading Indicators (1982=100)	140.8	144.4	2.6%	143.8	140.3	2.5%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	116.5	122.3	5.0%	119.7	114.7	4.3%
CPI-U (All Urban Consumers) Food & Beverages	116.0	123.3	6.3%	119.9	114.4	4.8%
CPI-U (All Urban Consumers) Housing	117.0	121.5	3.8%	119.5	115.3	3.7%
CPI-U (All Urban Consumers) Transportation	106.5	111.9	5.1%	109.9	106.4	3.3%
CPI-U (All Urban Consumers) Medical Care	136.3	146.1	7.2%	141.1	132.2	6.7%
CPI-U (All Urban Consumers) Energy	86.5	89.8	3.8%	89.9	89.1	0.9%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	106.2	112.2	5.6%	109.3	105.9	3.3%
GNP Price Deflator (1982=100) (qtly.)	119.4	125.2	4.9%	123.2	118.5	4.0%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	120.9	123.3	2.0%	122.2	120.3	1.6%
Total Civilian Employment (mil.)	114.1	117.1	2.6%	115.7	113.1	2.2%
Unemployment Rate	5.6	5.0	-10.7%	5.4	6.0	-9.8%
Construction						
Total Construction (mil. of dol.)	22,257.3	21,079.6	-5.3%	20,296.9	21,375.4	-5.0%
Residential	11,030.6	10,118.1	-8.3%	9,790.0	9,933.2	-1.4%
Nonresidential	7,332.7	6,600.2	-10.0%	6,885.3	7,573.3	-9.1%
Non-Building	3,894.0	4,361.3	12.0%	3,621.6	3,891.5	-6.9%
New Dwelling Units (no.)	135,745	115,923	-14.6%	116,075	127,348	-8.9%
Interest Rates						
Short Term (3-month Treasury bill rate)	5.69	8.83	55.2%	7.37	5.88	25.2%
Long Term (30-year Treasury bond yields)	8.61	9.33	8.4%	9.12	8.88	2.7%
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	8.50	11.50	35.3%	9.91	8.48	17.0%
Mortgage Rates (new homes)	8.77	9.63	9.8%	8.98	8.90	0.9%

Sources: *Business Conditions Digest*, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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RECENT TRENDS IN LABOR PRODUCTIVITY: UTAH AND THE NATION

Frank C. Hachman
Associate Director

Very interesting aspects of the structure and performance of the Utah economy are illuminated by the Gross State Product (GSP estimates[1] released by the Bureau of Economic Analysis of the U.S. Department of Commerce. These data are allocations to individual states of the industry-by-industry estimates of gross national product. In broad terms, Utah's measured real (not just dollar value) economic activity had expanded by 1986 to more than 180 percent of its average size in years 1969 through 1973. This is an annualized average growth rate of 4.3 percent and is considerably higher than the 2.5 percent averaged by the nation. The number of Utah workers also expanded but at a lower average rate of 3.7 percent per year. The possibility explored in these pages is not just that real output per worker was increasing in Utah but that it was expanding substantially faster in Utah than in the nation.

The industry-by-industry detail further indicates that in many of Utah's basic sectors, the recent trends in average product per worker have been phenomenally high. Over the 1979-1986 period, average real output per Utah coal miner increased at an average rate of 7.6 percent per year. The same year saw worker productivity in "Chemicals" increase at an annualized rate of 9.0 percent. "Petroleum and Coal Product" productivity grew at a rate of 12.5 percent per year while productivity in "Non-Electrical Machinery" grew at 14.3 percent per year.

The GSP estimates do provide a useful and interesting basis for analysis. But, unfortunately, the data do not have uniformly high levels of accuracy. There are serious limitations on quality arising both from the nature of accounting conventions and the non-availability of information when these measures are disaggregated to the detail of states and industries. But, used carefully, very interesting and useful indicators of trends, conditions, and especially, differences in trends among states and regions can be provided.

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[1] The character and magnitudes of these estimates were closely described by Senior Research Economist, Boyd L. Fjeldsted, in the Utah Economic and Business Review for July-August, 1988.

Trends in Gross Product: Utah and the U.S.

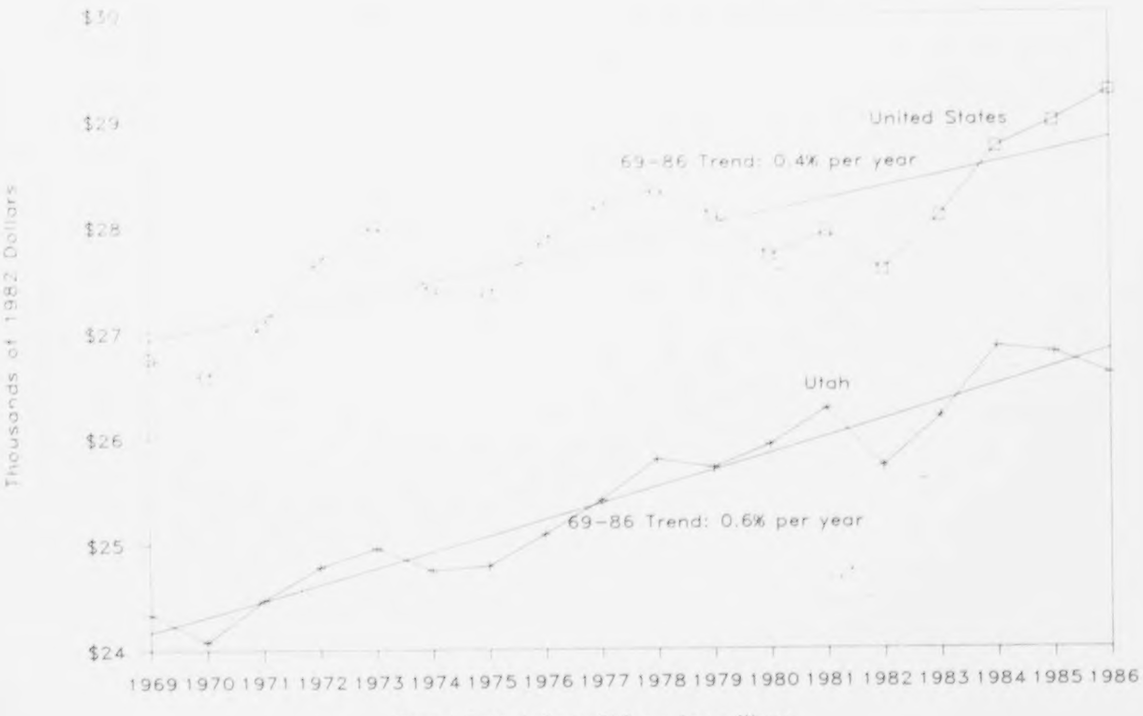
The broadly-encompassing measure, Gross State Product (GSP), does not conveniently afford a direct comparison between Utah and the United States, as Utah's 1986 GSP of $21.193 billion accounts for something less than one out of every $170 of economic production in the United States. Still, the local and national patterns of change in economic production can be compared by expressing the level of production for any year against the level of output for a base period. Values which accomplish this are presented in Table 1. Chart 1 thus shows the annual level of production for both Utah and the United States against their own average production levels, experienced over the 1969 through 1973 period, and also presents the calculated trend or average rate of change over the years 1969 through 1986.

Again, great accuracy should not be imputed to these numbers. Even if the year-by-year dollar values of production in an industrial sector, coal mining for example, were known with absolute precision, there is still a major step to take in deflating the dollar value of production by an appropriate price index to obtain the index of physical output. State-specific price indexes by industry are not generally available so the BEA deflated the dollar value of Utah coal production by the national price index for coal, regardless of the fact that Utah's mix of coal production, strip and underground, metallurgical and steam, is not at all typical of the national mix. However, a lack of great accuracy does not imply that useful generalizations cannot be drawn.

An important feature of Chart 1 is the expansion in Utah's Gross State Product by 1986 to more than 180 percent of its average size over the 1969-73 period. During the same interval the U.S. economy grew by less than 50 percent. The rate of growth in Utah's Real GSP averaged 4.3 percent per year, which is well above the trend of 2.5 percent per year for the nation as a whole. It is not plausible that the much higher real growth rate for Utah is a consequence of errors in estimation and in imputations. Furthermore, the series for total employment displayed in Chart 2 are consistent with a higher rate of growth in Utah. By 1986, Utah's total employment had reached about 170 percent of its average level of the years 1969-1973. The expansion in the nation's employment was only by about 40 percent, and the average national employment growth rate of 2.1 percent per year is less than 60 percent of Utah's trend of 3.7 percent per year.

A most interesting difference is suggested by these comparisons: not only did real output increase at higher rates than total employment for both Utah and the nation, but the difference between the trends in real output and total employment is greater in Utah than in

Chart 1
Trends in Real Gross Product per Worker



Trend Calculation: OLS on Logarithms

the nation. That is, real output per worker appears to have been increasing faster in Utah than in the nation. How confidently this possibility can be held is the concern of this article.

Problems with Price and Mix When Comparing Real Output Levels

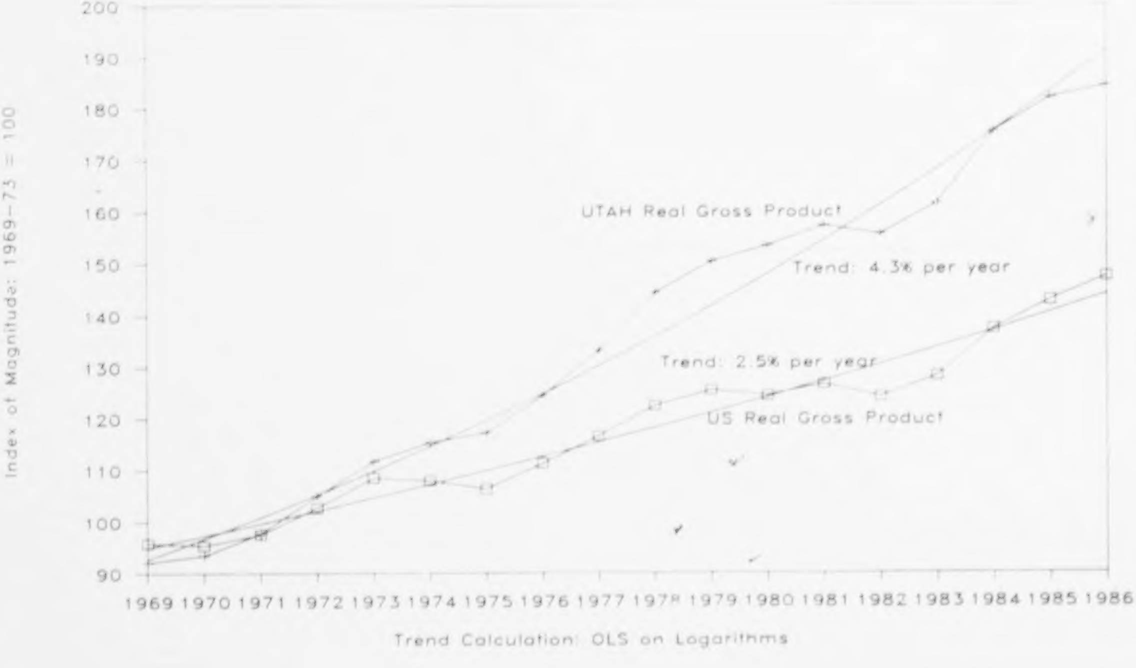
"Increasing at a higher rate" does not imply "is higher". The graphs in Chart 3 show for 1986, that Utah's Gross State Product was 26.6 thousand 1982 dollars per employed person while the nation's GNP was 29.3 thousand 1982 dollars per worker. The ratio of the two values describes the value added by economic activity per worker in the Utah economy in 1986 as being 90.9 percent of gross production per worker in the nation as a whole. This measure of relative productivity not only is less than 100 percent, it was down considerably from levels that had been consistently running at more than 93 percent throughout the earlier years of the 1980's.

The decrease in Utah's relative productivity between 1984 and 1986 was partly due to the sharp decline in employment in Utah's metal mining and primary metal manufacturing industries. Average productivities for Utah workers in these industries are much higher than the average of all Utah industries and actually are higher than the average productivities of these industries in the nation as a whole. Hence, Utah's relative productivity declined sharply when the combined employment in metal mining and metal manufacturing between 1984 and 1986 fell by 13.1 percent nationally, but dropped by 45.8 percent in Utah.

With the expectation that the extreme fall in share of Utah's metal mining and primary metal manufacturing was temporary, post-1986 data will exhibit a rebound in Utah's economy-wide average product. Still, two obvious actualities and a third, not-so-obvious actuality are apparent. Not only 1) is Utah's economy-wide productivity apparently somewhat lower than the nation's; and 2) clearly dependent upon the composition across industries of economic activity in Utah; but 3) average productivity in Utah is below the nation's, in spite of, rather than because of, the differences in composition between the two economies.

If a weighted average is taken of the sector-by-sector average product per worker for the 56 sectors into which the Utah economy was distributed, but with the weights being those of the distribution of national employment, the 1984 constant dollar Utah gross product per worker is reduced to $26,623 from the estimated $26,846. This is a small decrease of less than 1 percent and much smaller than the adjustment a similar process produces for Utah's average earnings per worker. Total earnings in 1984 for Utah's 751,591 workers and proprietors averaged out to $17,004 per

Chart 2
Trends in Real Gross Product



worker. Weighting the sector-specific Utah earnings by the national composition of employment diminishes the per worker earnings by nearly $700 to $16,309, for a reduction of over 4 percent.

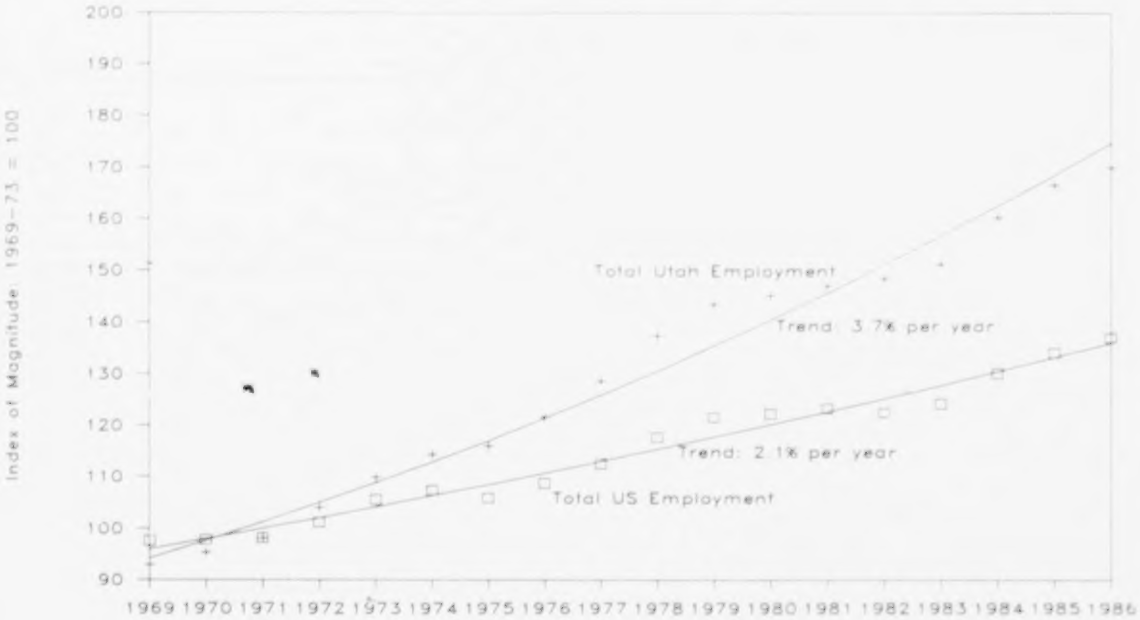
Average earnings appear to be more sensitive to differences in structure than are gross products. This suggests that allowances for capital charges and indirect business taxes vary less across regions than do wage rates. However, a specific finding is that Utah's relatively low wages and less than national average worker productivity are not a consequence of Utah's workers being relatively concentrated in low wage sectors. Instead, it is a reflection of Utah labor market conditions yielding less than national wage rates.

Additional support is available for the view that it is not the structure of the Utah economy that produces the low average wage. If the average wage for the United States is derived by giving the U.S. economy the composition of the Utah economy, earnings per worker for the U.S. in 1984 would increase from the actual $18,813 by more than $200 to $19,022 per worker. The implication is that workers in the Utah economy are relatively concentrated in higher wage sectors whether the wages are measured in Utah in the nation at large.

Lower Wages — Reflecting Relatively Good or Relatively Bad Conditions?

Economic considerations suggest that prices are lower when supply is relatively large compared to demand. But, there are both positive and negative possibilities in markets with low wages. A negative sense for Utah would be a relatively abundant supply of impaired labor with low employability elsewhere, a slowing expanding demand, and high worker relocation costs. A positive implication is of Utah being a state with a large endowment of amenities and lack of congestion and thus labor markets do not show it being necessary to persuade workers to stay with the inducement of high wages. It would be a matter for further research to come to a formal judgement as to whether the Utah labor market conditions reflect, on balance, a negative or a positive condition for a typical worker. What does matter at this point is the very real possibility that the seemingly low average products of Utah workers are not a cause of low wages, but rather that Utah's high levels of well-being with lower wages produces an estimate of low worker productivity because of the manner in which the estimates are generated.

Chart 3
Trends in Total Employment



Trend Calculation : OLS on Logarithms

The problem is not found in the estimation of the monetary value of State Gross Product. The current dollar or "nominal" estimates for value added in the farming, mining, construction, and manufacturing industries have their foundation in direct estimates obtained in the quinquennial economic censuses. The estimates of values added in the remaining industrial sectors are built up from the individually estimated components of gross state product: employee compensation, proprietor's income, capital charges, and indirect business taxes. There are numerous opportunities in both data quality and accounting convention for estimation errors to arise, but no obvious reason to suspect a systematic distortion of Utah's estimated value added compared to the estimates for other states. Unfortunately, plausibly acceptable estimates of current dollar gross state product do not necessarily imply adequate indexes of state-by-state constant dollar or "real" gross product.

The problem is deeper than even the very serious reservations that have been expressed over the quality of the price deflators used for some sectors. For example, Martin Neil Baily and Robert J. Gordon have suggested[2] that inappropriate price index conventions may even perversely indicate declining productivity in construction and several financial and service sectors while possibly national productivities in these sectors were actually increasing.

For an interest in comparisons across states of output per worker, it must be recognized that, in addition to any other index number problems, the deflation to 1982 dollars for an index of "real" gross output was performed, sector by sector, for every state by applying the national implicit price deflator for the individual sector. The consequence is quite direct. To the extent that the mix of industrial output within a sector in Utah differed in 1982 from the national mix, or **that the average 1982 price of product in Utah differed from the national sector price** even if the mix was the same, then the comparison of units of real output could differ materially from the measure of output in 1982 dollars.

This is a major limitation on the extent of application of the constant dollar state gross product series. It is entirely possible that the rate of change over time in the average physical product of Utah labor is well measured both absolutely and in comparison to the nation's, but that the difference in absolute level of average product between the state and the nation is badly distorted. Simply put, and without getting into the deeper problem of comparing apples and oranges, Utah's 1982 production of $25,724 worth of lower priced "apples" per worker may be more apples per worker that are represented by the nation's $27,576 worth of higher priced apples. This is likely to be the case to the extent that Utah's lower wage rates are reflected in lower prices for the regional production. The fact is that the constant dollar, state gross product estimates can be used to compare regions as to the **rates of change** in average product, but should **not** be employed in the comparison among regions as to their **absolute levels of output per worker** when product prices or intra-sector output mixes differ.

Selected Utah Sectors with High Rates of Increase in Productivity

Even given the qualification that little confidence can be placed in apparent differences in absolute levels of output per worker, the rates of change over time in output per worker are quite reliably measured. When this is done, industry by industry, some sectors display trends of an exceedingly interesting character. Viewing the regression-produced trend lines drawn on the fields of data points imparts an awareness of the year-to-year variation in calculated productivity and a sense of the often present sensitivity of estimated growth rate to accidents of inclusion or exclusion of end points. The 1979 was uniformly chosen for the start of the time interval for growth rate calculations as it typically appeared to be appropriate. However, there was no theoretical justification for it being the best year for this purpose and some sectors could well be recalculated with different groupings of years and with better descriptions of their patterns of change.

Even with the numerous caveats, the graphs of productivity trends reveal an amazing picture. In many of Utah's basic industries, the recent trends in average product per worker have been phenomenally high. A widely-held opinion has it that worker productivity in the United States has been languishing. While that can be argued to be the case in some sectors, these often are tertiary sectors with extraordinarily difficult measurement problems, some of which are beset by inappropriate accounting conventions on output evaluation. What is clear from these data is that much of the primary industry of the state and the nation has displayed, well beyond any reasonable doubt, high rates of increase in average annual worker productivity that in fact run counter to some commonly-held opinions. Additional charts for the industries of rapid productivity increase appear on page 13.

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[2] Baily, Martin Neil and Robert J. Gordon "The Productivity Slowdown, Measurement Issues, and the Explosion of Computer Power" in Brookings Paper on Economic Activity, 2:1988, The Brookings Institution, Washington, D.C.

Table 1

Gross Product Estimates by Sector in Constant (1982) Dollars

(millions)

Part 1: Estimates for the United States

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Gross Product	2395442	2384793	2437585	2567321	2713214	2697238	2658200	2783318	2913337	3062866	3137538	3111206	3166388	3194127	3205302	3433083	3568628	3681144
Total as an Index (1969 — 73 = 100)	**95.83**	**95.40**	**97.52**	**102.71**	**108.54**	**107.90**	**106.34**	**111.35**	**116.55**	**122.53**	**125.52**	**124.46**	**126.67**	**124.18**	**128.23**	**137.34**	**142.76**	**147.27**
Gross Product by Sector																		
Farms	57227	60670	62340	62019	61060	60725	64817	62489	62206	61017	64585	64164	75709	76975	61345	68465	78945	84708
Ag. Services, Forestry, and Fisheries	8040	8178	8279	8835	9239	9024	8292	9011	9428	10791	11536	11990	12280	12621	13126	13757	14640	15675
Metal Mining	3751	3962	3625	3586	3639	3618	3521	3878	3393	3396	3616	3544	3802	2321	2165	2528	2409	2432
Coal Mining	10409	11150	10243	10953	10848	11029	11860	12328	12630	12117	14081	14942	14836	15108	14292	16090	16090	15652
Oil and Gas Extraction	110669	115188	114306	115409	114086	110779	105709	103394	105268	108023	106921	111661	115519	110228	104055	108905	106480	94686
Nonmetallic Minerals, except Fuels	4112	4248	4206	4461	4786	4867	4492	4755	4907	5287	5412	5487	5608	4465	4929	5447	5599	5322
Construction	183580	167964	162744	166659	170363	162290	149436	158095	165084	176693	173548	161641	147382	140908	147349	159218	164188	168262
Lumber and Wood Products	14458	14722	15160	17211	17808	17582	16438	18234	18917	19319	20991	20436	18881	16041	18116	20396	20469	21604
Furniture and Fixtures	8152	7011	7382	8964	9677	8867	7769	9017	9807	11028	10809	10225	10067	9537	10388	11782	11554	11359
Stone, Clay, and Glass Products	18460	17704	18000	19766	21951	20614	18660	20806	21153	23194	23329	21078	19771	18160	19687	21595	22166	22169
Primary Metal Industries	51308	46802	45558	48693	57825	58763	44015	46027	46103	50463	49752	46373	48166	35281	30014	34690	34085	35034
Fabricated Metal Products	48221	44129	42283	46777	52053	47465	41773	47063	50338	52516	54926	52471	52189	46281	48948	55835	55769	54765
Machinery, except Electrical	57006	57045	53154	60435	68684	70326	64066	68324	73308	79168	83785	84556	88557	80008	86904	114845	137452	150767
Electric and Electronic Equipment	37279	34403	34464	38328	43905	40907	37605	41499	49548	56555	60227	62669	64296	61814	66237	77336	83835	84975
Motor Vehicles and Equipment	35875	26534	35540	38370	44561	36517	33707	44983	52330	54585	47940	33710	33949	29453	38460	47876	47711	44476
Transport Equip. Excl. Motor Vehicles	39086	34301	31068	32400	33576	35447	33756	32044	32332	35662	37230	38104	33250	32228	38578	42607	45357	48542
Instruments and Related Products	13991	12268	12446	13955	15348	16219	16122	16978	18983	20432	22490	21795	23681	22631	23150	25376	28288	29697
Miscellaneous Manufacturing Industries	10214	9891	10395	11569	11600	10774	11333	12443	13340	12997	12053	10091	12124	11081	9913	14502	14755	14348
Food and Kindred Products	43250	43837	45454	48292	52177	47086	48196	51239	51218	51957	54884	56675	58170	61427	61996	60810	62875	62553
Tobacco Manufactures	8177	8675	8680	9118	9516	9621	9967	9939	9555	9931	9850	9524	9869	8916	8932	8670	7281	6994
Textile Mill Products	10982	11603	12022	12863	12643	11323	10636	12991	15783	15492	16071	16071	15781	14827	16636	16723	15761	16931
Apparel and Other Textile Products	15003	13995	14165	16583	17895	16890	16738	18008	18644	19596	19609	20062	20251	18931	19795	20350	19576	19483
Paper and Allied Products	20071	18756	19698	21874	25089	23795	20197	24007	26093	27554	27063	24628	24561	26718	28746	30215	30616	31256
Printing and Publishing	31583	29850	30073	31598	33635	32524	32448	33403	34972	36852	37562	36904	38333	38364	39863	41265	42565	42314
Chemicals and Allied Products	33824	34368	36444	39796	44594	40284	39274	45807	50547	52424	55363	50083	53464	55257	59641	59992	56435	59438
Petroleum and Coal Products	20699	23841	25204	24474	25740	25107	25131	26982	28930	29149	28881	26738	25621	24352	23962	25010	24888	26398
Rubber and Misc. Plastic Products	14285	12728	13765	15715	18168	16848	15236	15846	18419	19673	19983	18877	20854	19283	21716	24270	25153	26037
Leather and Leather Products	4735	4305	4307	4443	4808	4626	4425	4945	4708	4896	4275	4313	4386	4061	3794	3783	3709	3017
Railroad Transportation	30093	28835	25884	26139	27305	27989	25570	26972	26939	27756	27844	27232	24773	19033	19075	20156	19801	19721
Local and Interurban Passenger Transit	8438	8115	8115	8282	7617	7048	7192	7401	7497	7623	7725	7024	6652	5993	5813	6089	6317	6335
Trucking and Warehousing	36796	36610	39232	44400	48729	48832	44115	48746	53518	57269	56576	51543	49000	46590	48557	53377	52404	54196
Water Transportation	6041	6570	6324	6495	7314	7284	6785	7492	7574	8236	8310	8251	8206	7440	7492	7812	7790	7752
Transportation by Air	15125	14897	15163	16550	17595	18488	17519	18906	20274	22345	24929	23067	20521	19001	19647	22136	23694	25727
Pipelines, except Natural Gas	3591	3764	3878	4155	4431	4416	4431	4495	4767	5113	5311	5133	4925	4940	4856	4960	4930	5128
Transportation Services	4122	4013	3749	4347	4603	4812	4921	5177	5674	6543	6970	7226	7514	7762	8298	9167	10029	10347
Communication	37412	40919	43031	47048	50516	52966	55224	58149	61855	67698	72463	78432	82832	85633	92070	92888	94268	95257
Electric, Gas, and Sanitary Services	58645	60181	64418	66383	74881	76939	80615	79805	80363	82239	83275	85493	91802	92049	95035	103769	105773	103882
Wholesale Trade	149000	151982	161198	175044	181434	180965	185599	191647	204093	214269	217329	213501	218356	219004	222021	250606	268856	282441
Retail Trade	212735	215610	224522	239758	255570	245220	247520	262757	275118	288055	294380	286905	288917	287480	307029	328302	343251	362225
Banking and Credit Agencies	39578	41596	42656	44178	46800	49519	50459	51476	53460	56156	59266	61904	64280	65248	66442	67614	68972	70752
All Other Invest. Insur. & Real Estate	274461	279112	293216	306745	320874	332101	337148	351660	364219	386294	399947	402424	409885	409891	422529	439030	454611	480566
Hotels and Other Lodging Places	16407	17057	16256	18184	19138	19030	19203	20374	21175	22216	23126	22649	22259	21674	22519	22888	23235	22931
Personal Services	23273	22899	22465	22972	22739	21982	21059	21690	22374	22893	22297	22231	21026	21279	21800	22431	24619	25582
Business Services	46362	47541	47541	51261	55979	58792	57068	60425	65052	71675	78752	84014	88460	90728	99982	110960	120668	129832
Auto Repair, Services, and Garages	14937	14895	16040	17405	19412	19429	19166	20598	22247	24397	25011	24427	24543	23523	25156	27347	29156	30082
Miscellaneous Repair Services	5866	5885	5933	6307	6547	7313	7428	7505	7946	8224	8933	8837	9662	9585	9738	10198	10333	10160
Motion Pictures	4324	4834	4712	4817	5299	4910	5191	5838	6139	7301	6090	5689	5788	6266	6192	6303	6725	6921
Amusement and Recreation Services	8994	9176	9350	9688	10811	11010	11332	12113	12993	13135	13630	13727	14692	15079	16121	16441	18010	18228
Health Services	73418	77820	83074	88044	94293	97985	103523	108351	114600	119002	123546	129368	137747	142007	146693	153084	158906	166006
Legal Services	21742	23209	23638	23699	24983	25472	24738	25533	26359	28805	28561	28867	30640	30579	31649	32781	35044	36878
Educational Services	14090	14606	15314	15639	15925	16480	16786	16824	16786	17168	17550	18105	18621	19118	19825	20628	21183	21355
Social Services, Membership, & Misc.	46236	46458	47298	51476	54919	56321	58712	59994	64042	68579	74433	77287	81726	76199	78790	82155	84628	87917
Private Households	12101	11319	10814	10487	10160	8777	8186	8449	8660	8466	7826	7381	7326	7596	8126	8811	8817	9024
Federal Civilian Government	85158	82139	80432	77315	75366	77550	77829	80272	81420	83982	83675	83733	82686	80085	82159	84023	86152	86117
Federal Military Government	52719	49954	47917	45745	45572	45345	43622	41809	41582	41344	41034	42748	44935	46667	47760	47102	47803	48865
State and Local Government	179322	186671	194210	201612	209128	216346	221641	224325	228667	235316	241977	245196	247357	246404	247191	249687	254002	258023

Table 1 (continued)

Part 2: Estimates for the State of Utah

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Gross Product	10599	10750	11242	12083	12850	13267	13482	14315	15324	16611	17291	17639	18093	17892	18570	20177	20920	21193
Total as an Index (1969 — 73 = 100)	**92.13**	**93.44**	**97.72**	**105.03**	**111.69**	**115.32**	**117.19**	**124.43**	**133.2**	**144.38**	**150.29**	**153.32**	**157.26**	**155.52**	**161.41**	**175.38**	**181.84**	**184.21**
Gross Product by Sector																		
Farms	262	287	288	278	254	235	223	247	235	232	281	314	307	340	312	298	333	387
Ag. Services, Forestry, and Fisheries	19	19	20	23	23	23	22	25	28	31	33	35	39	42	44	50	53	48
Metal Mining	326	323	318	301	238	254	241	263	247	247	293	285	306	170	194	183	106	103
Coal Mining	90	82	75	79	98	103	134	186	201	191	254	287	306	345	254	247	267	276
Oil and Gas Extraction	402	396	396	483	605	648	574	488	583	601	526	566	623	482	416	483	410	284
Nonmetallic Minerals, except Fuels	37	32	25	25	26	30	33	40	43	42	44	48	55	46	45	45	49	48
Construction	729	705	767	925	976	964	974	1171	1305	1341	1308	1135	982	945	1018	1176	1154	1037
Lumber and Wood Products	27	28	32	41	45	46	63	69	74	79	81	79	73	58	64	76	76	71
Furniture and Fixtures	9	11	15	19	21	21	17	21	23	31	34	35	36	36	47	56	59	55
Stone, Clay, and Glass Products	82	78	92	108	124	119	111	129	134	152	163	141	126	117	130	164	171	167
Primary Metal Industries	476	427	403	441	476	475	342	325	300	318	320	332	390	294	231	264	248	195
Fabricated Metal Products	116	109	107	121	148	138	158	177	181	193	197	202	207	187	181	220	202	186
Machinery, except Electrical	124	145	186	211	244	261	271	301	322	354	397	451	547	578	696	937	1158	1311
Electric and Electronic Equipment	60	52	35	44	51	47	59	65	83	112	145	188	202	205	211	267	257	264
Motor Vehicles and Equipment	15	12	15	20	23	25	29	40	45	58	55	34	41	43	55	77	73	68
Transport Equip. Excl. Motor Vehicles	172	187	204	226	232	263	213	183	191	219	256	294	287	293	373	467	551	586
Instruments and Related Products	14	14	14	15	22	35	33	47	64	69	88	86	80	76	85	97	114	127
Miscellaneous Manufacturing Industries	15	17	22	28	31	31	28	33	36	42	43	38	43	40	35	54	63	61
Food and Kindred Products	143	148	146	159	169	158	165	176	179	182	193	196	207	223	218	219	239	248
Tobacco Manufactures	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textile Mill Products	1	1	1	1	1	1	1	2	2	2	2	1	1	1	2	3	2	2
Apparel and Other Textile Products	33	34	34	40	46	52	54	65	67	79	80	78	81	78	83	82	77	76
Paper and Allied Products	12	11	13	17	19	18	15	15	16	18	19	18	19	21	23	27	43	50
Printing and Publishing	75	74	71	76	88	95	102	112	122	140	152	157	168	175	183	199	208	205
Chemicals and Allied Products	25	29	37	47	56	52	57	61	82	103	123	128	156	173	180	199	186	188
Petroleum and Coal Products	95	124	149	134	172	110	131	150	149	157	164	145	164	167	195	230	246	258
Rubber and Misc. Plastic Products	14	12	11	12	18	22	25	28	39	38	40	42	42	32	31	37	42	48
Leather and Leather Products	1	1	2	2	2	2	1	2	3	3	2	1	3	2	1	1	1	1
Railroad Transportation	280	267	243	246	244	243	211	204	190	212	238	247	241	212	222	245	253	252
Local and Interurban Passenger Transit	32	31	31	31	29	29	30	36	43	47	51	49	45	20	19	18	18	19
Trucking and Warehousing	221	229	265	309	334	341	327	370	402	425	427	392	363	338	328	360	348	356
Water Transportation	0	0	0	0	0	0	1	2	2	2	3	3	3	3	4	0	0	0
Transportation by Air	46	47	48	58	58	64	60	71	68	88	84	86	85	115	169	183	177	197
Pipelines, except Natural Gas	18	21	21	22	27	34	28	27	27	46	63	79	87	99	82	87	90	94
Transportation Services	12	11	11	14	15	16	17	20	22	25	-23	20	23	26	28	33	38	40
Communication	171	182	191	205	236	258	281	300	324	356	388	426	462	471	516	515	534	497
Electric, Gas, and Sanitary Services	264	267	295	310	354	390	459	474	501	576	630	747	909	978	1058	1117	1095	1080
Wholesale Trade	686	706	750	829	883	904	934	971	1052	1157	1191	1189	1228	1221	1239	1354	1460	1511
Retail Trade	959	979	1053	1177	1291	1278	1328	1461	1563	1671	1704	1650	1673	1680	1800	1961	2051	2132
Banking and Credit Agencies	184	189	186	189	198	216	213	221	227	260	283	287	307	319	338	359	350	355
All Other Invest. Insur. & Real Estate	1040	1089	1174	1321	1389	1575	1713	1766	1885	2182	2280	2371	2233	2249	2288	2371	2451	2507
Hotels and Other Lodging Places	61	68	70	82	78	80	106	113	121	132	140	136	129	144	143	162	136	133
Personal Services	90	91	92	96	95	97	98	104	110	114	114	113	103	108	109	117	130	132
Business Services	117	130	139	154	172	195	203	222	251	279	309	339	359	357	399	463	515	547
Auto Repair, Services, and Garages	80	78	85	96	114	115	115	127	141	155	165	168	167	164	172	192	202	200
Miscellaneous Repair Services	32	32	33	43	45	51	50	53	60	63	68	68	74	80	73	74	77	71
Motion Pictures	24	20	24	25	22	20	26	31	39	70	39	28	25	27	27	38	39	45
Amusement and Recreation Services	36	38	47	53	62	57	52	57	61	63	67	66	70	71	74	85	99	95
Health Services	308	322	348	360	383	405	439	472	527	539	575	626	680	702	697	725	766	821
Legal Services	66	72	71	73	79	89	93	100	107	108	103	103	120	124	127	128	135	141
Educational Services	79	84	90	97	97	103	109	109	113	114	121	122	125	126	151	158	158	159
Social Services, Membership, & Misc.	177	178	172	193	233	234	256	279	309	362	371	376	423	400	426	462	477	469
Private Households	22	21	20	20	19	17	16	17	17	17	16	15	15	16	17	19	19	19
Federal Civilian Government	1148	1121	1141	974	921	965	930	921	920	931	908	933	935	915	949	978	1036	1050
Federal Military Government	143	138	149	161	172	158	147	158	166	174	184	202	204	207	221	222	230	240
State and Local Government	929	981	1018	1070	1092	1103	1162	1210	1324	1406	1451	1481	1516	1554	1584	1594	1645	1679

Source: U. S. Department Of Commerce, Bureau Of Economic Analysis, Unpublished Data provided on Diskette, July 1988.

Table 2

Employment Estimates — Wage, Salary, and Proprietors

(thousands of workers)

Part 1: Estimates For The United States

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Employment	89520	89753	90654	92773	96854	98529	97177	99860	103324	108092	111632	112257	113313	112565	114147	119485	123176	125822
Farms	3978	3962	3915	3870	3897	3968	3948	3973	3853	3758	3848	3819	3690	3621	3710	3580	3456	3332
Ag. Services, Forestry, and Fisheries	504	520	547	575	610	625	658	703	744	809	843	889	911	934	990	1056	1110	1166
Metal Mining	95	100	94	91	92	100	96	97	97	98	107	108	111	84	69	67	58	55
Coal Mining	140	150	152	165	166	186	222	238	250	245	266	262	248	253	205	211	200	186
Oil and Gas Extraction	346	329	328	326	339	369	393	414	457	523	585	700	869	901	828	841	831	678
Nonmetallic Minerals, except Fuels	126	125	120	119	123	126	124	122	125	129	132	132	126	118	114	116	117	116
Construction	4464	4392	4460	4739	5080	5050	4669	4774	5098	5612	5897	5634	5540	5341	5460	6049	6399	6698
Lumber and Wood Products	679	655	661	690	726	708	702	761	808	848	866	793	750	674	734	789	790	812
Furniture and Fixtures	493	468	467	510	545	523	426	457	477	509	505	475	478	448	466	506	514	518
Stone, Clay, and Glass Products	673	660	650	676	712	710	647	666	689	724	733	693	671	609	613	639	633	635
Primary Metal Industries	1363	1316	1226	1231	1323	1346	1146	1157	1188	1223	1255	1153	1130	932	834	866	811	755
Fabricated Metal Products	1457	1396	1347	1400	1516	1520	1474	1529	1594	1683	1726	1629	1608	1446	1388	1478	1495	1445
Machinery, except Electrical	2069	2015	1837	1919	2124	2258	2095	2112	2213	2371	2539	2524	2529	2280	2063	2228	2222	2080
Electric and Electronic Equipment	2043	1925	1782	1840	2032	2049	1710	1786	1884	2026	2135	2116	2119	2032	2038	2224	2211	2132
Motor Vehicles and Equipment	920	814	847	986	969	911	788	878	954	1009	1001	799	796	707	752	856	880	873
Transport Equip. Excl. Motor Vehicles	1476	1255	1090	1099	1132	1105	920	913	940	1009	1087	1113	1113	1040	995	1045	1106	1153
Instruments and Related Products	481	465	438	460	496	521	549	576	620	656	691	708	729	716	699	713	719	704
Miscellaneous Manufacturing Industrie	481	463	460	479	500	505	466	491	501	516	521	498	488	463	453	462	450	445
Food and Kindred Products	1812	1799	1768	1743	1733	1729	1677	1697	1723	1741	1746	1722	1692	1656	1624	1623	1613	1622
Tobacco Manufactures	81	81	77	77	79	79	73	72	70	69	69	67	70	68	66	64	62	59
Textile Mill Products	1014	987	966	1004	1037	992	872	922	916	912	893	859	831	757	752	754	706	713
Apparel and Other Textile Products	1429	1381	1358	1388	1426	1367	1260	1344	1339	1359	1325	1290	1271	1189	1193	1230	1161	1140
Paper and Allied Products	714	703	680	685	701	702	643	674	693	701	708	692	688	664	663	681	680	677
Printing and Publishing	1146	1146	1115	1135	1161	1167	1141	1170	1217	1270	1322	1342	1363	1365	1391	1471	1524	1567
Chemicals and Allied Products	1068	1057	1020	1011	1042	1063	1027	1054	1085	1106	1122	1120	1119	1090	1059	1058	1055	1034
Petroleum and Coal Products	187	189	187	185	186	191	190	195	201	206	208	204	212	199	194	185	177	168
Rubber and Misc. Plastic Products	597	579	576	625	677	673	602	650	717	758	786	728	739	693	712	786	790	792
Leather and Leather Products	347	322	303	303	301	285	254	273	266	267	255	243	248	227	213	194	171	155
Railroad Transportation	643	626	597	575	572	579	548	528	528	523	535	512	484	423	377	379	355	330
Local and Interurban Passenger Transit	342	339	339	331	329	333	330	324	322	330	329	322	321	321	324	339	347	358
Trucking and Warehousing	1314	1314	1325	1391	1470	1493	1405	1431	1531	1637	1681	1647	1623	1566	1584	1738	1796	1832
Water Transportation	235	231	209	212	214	216	207	206	207	223	223	228	234	219	207	208	204	193
Transportation by Air	358	359	348	353	373	377	373	379	395	420	454	468	466	459	468	499	531	565
Pipelines, except Natural Gas	18	17	17	17	16	16	17	18	18	20	20	22	22	21	21	19	19	18
Transportation Services	124	128	129	133	146	157	152	167	183	201	220	228	247	265	287	322	343	356
Communication	1055	1126	1129	1150	1181	1199	1184	1174	1197	1250	1321	1365	1407	1445	1383	1375	1366	1330
Electric, Gas, and Sanitary Services	694	711	725	747	764	770	756	760	777	802	834	855	885	905	918	938	957	967
Wholesale Trade	4082	4163	4227	4323	4525	4657	4868	5004	5170	5440	5669	5733	5822	5709	5682	5971	6116	6159
Retail Trade	13378	13626	13966	14334	14963	15250	15123	15750	16405	17258	17737	17809	18023	18098	18482	19459	20167	20661
Banking and Credit Agencies	1357	1423	1460	1521	1611	1700	1737	1773	1848	1956	2072	2156	2227	2256	2317	2397	2478	2587
All Other Invest. Insur. & Real Estate	3345	3491	3600	3856	4115	4183	4122	4321	4578	4889	5216	5400	5537	5635	5844	6224	6634	7129
Hotels and Other Lodging Places	961	968	996	1024	1082	1111	1058	1081	1103	1167	1209	1227	1268	1282	1313	1420	1498	1546
Personal Services	1646	1629	1565	1570	1580	1568	1554	1602	1659	1715	1744	1763	1819	1875	1993	2133	2454	2564
Business Services	1941	2016	2043	2228	2476	2627	2698	2911	3142	3446	3851	4085	4352	4726	5190	5822	6436	6911
Auto Repair, Services, and Garages	568	580	617	645	683	696	708	740	795	849	885	893	901	937	998	1107	1191	1225
Miscellaneous Repair Services	394	407	420	426	469	490	493	521	539	564	580	598	594	583	575	650	662	721
Motion Pictures	217	215	214	217	221	222	226	225	234	239	242	249	251	251	263	292	300	309
Amusement and Recreation Services	637	655	701	743	812	868	891	928	999	1041	1071	1132	1132	1171	1195	1253	1296	1303
Health Services	3124	3281	3501	3851	4149	4391	4620	4841	5073	5343	5577	5863	6189	6473	6664	6822	7102	7368
Legal Services	421	443	453	479	532	565	588	620	662	700	743	789	851	916	957	1015	1081	1146
Educational Services	1278	1309	1330	1397	1432	1472	1334	1332	1309	1360	1419	1491	1522	1553	1623	1688	1754	1790
Social Services, Membership, & Misc.	2800	2840	2916	3147	3322	3422	3739	3837	4028	4340	4536	4713	4736	4771	4922	5136	5293	5495
Private Households	2330	2280	2238	2200	2097	1916	1875	1881	1936	1899	1753	1598	1606	1635	1636	1637	1596	1586
Federal Civilian Government	2919	2902	2866	2856	2839	2902	2912	2901	2894	2941	2951	3047	2970	2940	2947	2997	3059	3096
Federal Military Government	3419	3232	3061	2820	2766	2734	2656	2553	2475	2450	2425	2451	2531	2616	2657	2683	2738	2785
State and Local Government	9744	10192	10592	11001	11333	11790	12236	12359	12602	12949	13168	13303	13152	13008	13050	13192	13467	13784

Table 2 (continued)

Part 2: Estimates for the State of Utah

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Employment	436	446	459	488	515	536	544	571	603	644	672	680	689	696	709	752	781	797
Farms	22	21	21	19	19	19	20	20	20	20	19	20	20	20	21	20	20	20
Ag. Services, Forestry, and Fisheries	1	1	2	2	2	2	2	2	3	3	3	3	3	4	4	5	5	5
Metal Mining	9	9	9	8	8	8	7	8	8	8	9	9	9	7	6	4	2	2
Coal Mining	1	1	1	2	2	2	2	3	3	3	4	5	5	5	3	3	3	3
Oil and Gas Extraction	1	1	1	2	2	3	3	2	3	4	4	5	6	6	5	6	4	3
Nonmetallic Minerals, except Fuels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Construction	19	20	22	[illegible]	30	31	32	36	41	45	46	42	38	37	40	47	48	46
Lumber and Wood Products	2	1	2	2	2	2	3	3	4	4	4	4	4	3	4	4	4	4
Furniture and Fixtures	1	1	1	1	2	1	1	1	1	2	2	2	2	2	2	3	3	3
Stone, Clay, and Glass Products	3	3	3	3	4	4	3	4	4	4	5	4	4	4	4	4	5	4
Primary Metal Industries	9	9	8	8	8	9	8	8	8	8	8	8	9	7	6	6	5	4
Fabricated Metal Products	3	3	3	3	4	4	5	5	5	6	6	6	7	7	6	7	6	6
Machinery, except Electrical	5	6	7	7	8	9	9	9	10	10	11	12	13	13	13	15	15	14
Electric and Electronic Equipment	3	3	2	2	3	3	3	4	4	5	6	8	8	9	8	10	9	9
Motor Vehicles and Equipment	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Transport Equip. Excl. Motor Vehicles	7	6	6	6	7	7	6	5	5	6	7	8	8	9	10	11	13	13
Instruments and Related Products	1	1	1	1	1	2	2	3	3	4	5	5	4	4	4	4	4	4
Miscellaneous Manufacturing Industrie	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	3
Food and Kindred Products	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	10
Tobacco Manufactures	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textile Mill Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apparel and Other Textile Products	5	5	5	6	6	6	6	7	7	7	7	6	6	6	6	6	6	6
Paper and Allied Products	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
Printing and Publishing	4	4	4	4	5	5	5	5	6	6	6	7	7	7	7	7	8	8
Chemicals and Allied Products	1	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
Petroleum and Coal Products	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rubber and Misc. Plastic Products	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2
Leather and Leather Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad Transportation	6	6	6	5	5	5	5	5	4	5	5	5	4	4	4	4	4	3
Local and Interurban Passenger Transit	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1
Trucking and Warehousing	7	7	8	9	9	10	10	10	11	12	12	12	12	12	11	12	13	13
Water Transportation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation by Air	1	1	1	1	1	1	1	1	1	2	2	2	2	3	4	4	4	5
Pipelines, except Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation Services	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Communication	5	5	5	5	6	6	6	6	6	7	7	8	8	9	9	8	8	8
Electric, Gas, and Sanitary Services	3	4	4	4	4	4	5	5	5	6	6	7	7	8	8	8	8	8
Wholesale Trade	22	22	22	24	25	27	28	29	30	33	35	36	37	36	36	36	37	38
Retail Trade	69	71	74	80	86	89	91	98	103	110	111	111	113	115	117	124	130	134
Banking and Credit Agencies	7	7	8	8	9	10	10	10	11	12	13	13	14	14	15	16	16	17
All Other Invest. Insur. & Real Estate	14	15	16	18	20	21	21	23	25	28	31	32	33	33	34	36	39	42
Hotels and Other Lodging Places	4	5	5	5	6	6	7	7	7	8	8	8	8	9	9	10	10	11
Personal Services	8	8	8	8	8	8	8	9	9	10	10	10	10	11	11	13	14	15
Business Services	7	8	9	10	10	11	13	14	15	16	19	20	22	26	28	32	37	40
Auto Repair, Services, and Garages	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	8	8	8
Miscellaneous Repair Services	2	2	3	3	3	4	3	4	4	4	4	5	5	5	4	5	5	5
Motion Pictures	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	3	2	3
Amusement and Recreation Services	3	3	4	4	5	5	5	5	5	6	6	6	6	7	7	8	8	9
Health Services	14	14	15	17	19	20	22	23	25	27	29	31	33	35	36	37	40	42
Legal Services	2	2	2	2	2	2	3	3	3	3	3	4	4	5	5	5	6	6
Educational Services	11	11	12	14	14	14	13	13	13	14	16	16	16	16	17	18	19	19
Social Services, Membership, & Misc.	12	12	13	14	16	16	17	19	21	23	24	25	25	26	26	28	29	29
Private Households	6	6	6	6	6	5	5	6	6	6	6	5	5	6	6	6	6	6
Federal Civilian Government	42	41	40	39	38	37	37	37	37	37	37	37	37	37	37	38	39	40
Federal Military Government	15	15	15	15	16	15	14	14	13	14	15	15	14	14	16	16	16	17
State and Local Government	59	63	66	69	72	74	77	77	82	86	87	87	87	87	90	93	97	100

Source: U. S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, SA Files, August, 1988.

Table 3
Constant Dollar Gross State Product per Worker by Sector

Part 1: Estimates For The United States

(thousands of 1982 dollars per worker)

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Gross Product Per Worker	26.8	26.6	27.1	27.7	28.0	27.4	27.4	27.9	28.2	28.3	28.1	27.7	27.9	27.6	28.1	28.7	29.0	29.3
Farms	14.4	15.3	15.9	16.0	15.7	15.3	16.4	15.7	16.1	16.2	16.8	16.8	20.5	21.3	16.5	19.1	22.8	25.4
Ag. Services, Forestry, and Fisheries	15.9	15.7	15.1	15.4	15.1	14.4	12.6	12.8	12.7	13.3	13.7	13.5	13.5	13.5	13.3	13.0	13.2	13.4
Metal Mining	39.3	39.8	38.4	39.6	39.4	36.2	36.7	40.1	34.9	34.6	33.8	32.9	34.3	27.6	31.5	38.0	41.9	44.1
Coal Mining	74.2	74.3	67.3	66.3	65.4	59.3	53.5	51.8	50.6	49.5	53.0	57.0	59.8	59.7	69.7	76.4	80.4	84.4
Oil and Gas Extraction	319.9	349.7	348.5	353.9	336.5	300.5	268.7	249.9	230.2	206.5	182.6	159.5	132.9	122.3	125.6	129.5	128.2	139.6
Nonmetallic Minerals, except Fuels	34.2	35.3	35.1	37.6	39.1	38.8	36.2	39.0	39.4	41.0	41.0	41.6	44.4	37.9	43.4	47.1	47.9	45.9
Construction	41.1	38.2	36.5	35.2	33.5	32.1	32.0	33.1	32.4	31.5	29.4	28.7	26.6	25.4	27.0	26.3	25.7	25.1
Lumber and Wood Products	21.3	22.5	22.9	24.9	24.5	24.8	23.4	24.0	23.4	22.8	24.2	25.8	25.2	23.8	24.7	25.9	25.9	26.6
Furniture and Fixtures	16.5	15.0	15.8	17.6	17.7	16.9	18.3	19.7	20.6	21.7	21.4	21.5	21.0	21.3	22.3	23.3	22.5	21.9
Stone, Clay, and Glass Products	27.4	26.8	27.7	29.3	30.8	29.0	28.8	31.3	30.7	32.0	31.8	30.4	29.5	29.8	32.1	33.8	35.0	34.9
Primary Metal Industries	37.7	35.6	37.2	39.6	43.7	43.7	38.4	39.8	38.8	41.3	39.6	40.2	42.6	37.9	36.0	40.1	42.0	46.4
Fabricated Metal Products	33.1	31.6	31.4	33.4	34.3	31.2	28.3	30.8	31.6	31.2	31.8	32.2	32.5	32.0	35.3	37.8	37.3	37.9
Machinery, except Electrical	27.6	28.3	28.9	31.5	32.3	31.1	30.6	32.4	33.1	33.4	33.0	33.5	35.0	35.1	42.1	51.5	61.9	72.5
Electric and Electronic Equipment	18.3	17.9	19.3	20.8	21.6	20.0	22.0	23.2	26.3	27.9	28.2	29.6	30.3	30.4	32.5	34.8	37.9	39.9
Motor Vehicles and Equipment	39.0	32.6	42.0	43.3	46.0	40.1	42.8	51.2	54.9	54.1	47.9	42.2	42.7	41.7	51.2	55.9	54.2	51.0
Transport Equip. Excl. Motor Vehicles	26.5	27.3	28.5	29.5	29.7	32.1	36.7	35.1	34.4	35.3	34.3	34.2	29.9	31.0	38.8	40.8	41.0	42.1
Instruments and Related Products	29.1	26.4	28.4	30.4	31.0	31.2	29.4	29.5	30.6	31.2	32.6	30.8	32.5	31.6	33.1	35.6	39.4	42.2
Miscellaneous Manufacturing Industries	21.2	21.4	22.6	24.1	23.2	21.3	24.3	25.4	26.6	25.2	23.1	20.3	24.9	23.9	21.9	31.4	32.8	32.3
Food and Kindred Products	23.9	24.4	25.7	27.7	30.2	27.2	28.7	30.2	29.7	29.9	31.4	32.9	34.4	37.1	38.2	37.5	39.0	38.6
Tobacco Manufactures	100.8	107.0	115.2	118.3	120.3	121.5	136.0	137.5	135.9	143.1	141.9	141.3	142.0	130.4	136.4	136.5	118.4	119.6
Textile Mill Products	10.8	11.8	12.5	12.8	12.2	11.4	12.2	14.1	17.2	17.0	18.0	18.7	19.0	19.6	22.1	22.2	22.3	23.8
Apparel and Other Textile Products	10.5	10.1	10.4	12.0	12.5	12.4	13.3	13.4	13.9	14.4	14.8	15.6	15.5	15.9	16.6	16.5	16.9	17.1
Paper and Allied Products	28.1	26.7	29.0	31.9	35.8	33.9	31.4	35.6	37.7	39.3	38.2	35.6	35.7	40.2	43.4	44.4	45.0	46.2
Printing and Publishing	27.6	26.0	27.0	27.8	29.0	27.9	28.4	28.5	28.7	29.0	28.4	27.5	28.1	28.1	28.7	28.1	27.9	27.0
Chemicals and Allied Products	31.7	32.5	35.7	39.4	42.8	37.9	38.2	43.5	46.6	47.4	49.4	44.7	47.8	50.7	56.3	56.7	53.5	57.5
Petroleum and Coal Products	110.6	126.0	134.6	132.6	138.7	131.7	132.5	133.7	144.2	141.8	139.0	131.3	120.5	122.6	123.6	136.3	140.8	157.3
Rubber and Misc. Plastic Products	23.9	22.0	23.9	25.2	26.8	25.0	25.3	24.4	25.7	26.0	25.4	25.9	28.2	27.8	30.5	30.9	31.8	32.9
Leather and Leather Products	13.6	13.4	14.2	14.7	16.0	16.2	17.4	18.1	17.7	18.3	16.8	17.7	17.7	17.9	17.9	19.5	21.7	19.5
Railroad Transportation	46.8	46.1	43.4	45.5	47.7	48.3	46.7	51.1	51.0	53.1	52.0	53.2	51.2	45.0	50.6	53.2	55.8	59.8
Local and Interurban Passenger Transit	24.7	23.9	24.0	25.0	23.1	21.2	21.8	22.8	23.3	21.1	23.5	21.8	20.7	18.7	18.0	17.9	18.2	17.7
Trucking and Warehousing	28.0	27.9	29.6	31.9	33.2	32.7	31.4	34.1	35.0	35.0	33.7	31.3	30.2	29.7	30.7	30.7	29.2	29.6
Water Transportation	25.7	28.5	30.2	30.6	34.2	33.7	32.8	36.4	36.6	36.9	37.3	36.2	35.1	34.0	36.2	37.5	38.3	40.1
Transportation by Air	42.2	41.5	43.5	46.9	47.2	49.1	46.9	49.9	51.3	53.2	54.9	49.3	44.0	41.4	42.0	44.3	44.7	45.6
Pipelines, except Natural Gas	199.5	221.4	228.1	244.4	276.9	276.0	260.6	249.7	264.8	255.7	265.6	233.3	223.9	235.2	231.2	261.1	259.5	284.9
Transportation Services	33.4	31.3	29.0	32.6	31.6	30.7	32.3	31.0	31.0	32.5	31.6	31.7	30.4	29.3	28.9	28.5	29.3	29.1
Communication	35.5	36.3	38.1	40.9	42.8	44.2	46.7	49.5	51.7	54.1	54.9	57.5	58.9	59.3	66.6	67.5	69.0	71.6
Electric, Gas, and Sanitary Services	84.5	84.6	88.9	88.8	98.0	100.0	106.6	105.0	103.5	102.5	99.9	99.9	103.8	101.7	103.6	110.6	110.5	107.5
Wholesale Trade	36.5	36.5	38.1	40.5	40.1	38.9	38.1	38.3	39.5	39.4	38.3	37.2	37.5	38.4	39.1	42.0	44.0	45.9
Retail Trade	15.9	15.8	16.1	16.7	17.1	16.1	16.4	16.7	16.8	16.7	16.6	16.1	16.0	15.9	16.6	16.9	17.0	17.5
Banking and Credit Agencies	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	28.9	28.7	28.6	28.7	28.9	28.9	28.7	28.2	27.8	27.3
All Other Invest. Insur. & Real Estate	82.1	79.9	81.4	79.6	78.0	79.4	81.8	81.4	79.6	79.0	76.7	74.5	74.0	72.7	72.3	70.5	68.5	67.4
Hotels and Other Lodging Places	17.1	17.6	16.3	17.8	17.7	17.1	18.2	18.3	19.2	19.0	19.1	18.5	17.6	16.9	17.2	16.1	15.5	14.8
Personal Services	14.1	14.1	14.4	14.6	14.4	14.0	13.6	13.5	13.5	13.4	12.8	12.6	11.6	11.3	10.9	10.5	10.0	10.0
Business Services	23.9	23.6	23.3	23.0	22.6	22.4	21.2	20.8	20.7	20.8	20.4	20.6	20.3	19.2	19.3	19.1	18.7	18.8
Auto Repair, Services, and Garages	26.3	25.7	26.0	27.0	28.4	27.9	27.1	27.8	28.0	28.7	28.3	27.3	27.2	25.1	25.2	24.7	24.5	24.6
Miscellaneous Repair Services	14.9	14.5	14.1	14.8	13.9	14.9	15.1	14.4	14.8	14.6	15.4	14.8	16.3	16.5	16.9	15.7	15.6	14.1
Motion Pictures	20.0	22.5	22.0	22.2	24.0	22.2	23.0	26.0	26.3	30.5	25.1	22.9	23.0	25.0	23.6	21.6	22.4	22.4
Amusement and Recreation Services	14.1	14.0	13.3	13.0	13.3	12.7	12.7	13.1	13.0	12.6	12.7	12.1	13.0	12.9	13.5	13.1	13.9	14.0
Health Services	23.5	23.7	23.7	22.9	22.7	22.3	22.4	22.4	22.6	22.3	22.2	22.1	22.3	21.9	22.0	22.4	22.4	22.5
Legal Services	51.7	52.4	52.1	49.4	46.9	45.1	42.1	41.2	39.8	41.2	38.5	36.6	36.0	33.4	33.1	32.3	32.4	32.2
Educational Services	11.0	11.2	11.5	11.2	11.1	11.2	12.6	12.6	12.8	12.6	12.4	12.1	12.2	12.3	12.2	12.2	12.1	11.9
Social Services, Membership, & Misc.	16.5	16.4	16.2	16.4	16.5	16.5	15.7	15.6	15.9	15.8	16.4	16.4	17.3	16.0	16.0	16.0	16.0	16.0
Private Households	5.2	5.0	4.8	4.8	4.8	4.6	4.4	4.5	4.5	4.5	4.5	4.6	4.6	4.5	5.0	5.4	5.5	5.7
Federal Civilian Government	29.2	28.3	28.1	27.1	26.5	26.7	26.7	27.7	28.1	28.6	28.4	27.5	27.8	27.2	27.9	28.0	28.2	27.8
Federal Military Government	15.4	15.5	15.7	16.2	16.5	16.6	16.4	16.4	16.8	16.9	16.9	17.4	17.8	17.8	18.0	17.6	17.5	17.5
State and Local Government	18.4	18.3	18.3	18.3	18.4	18.4	18.1	18.2	18.1	18.2	18.4	18.4	18.8	18.9	18.9	18.9	18.9	18.7

Table 3 (Continued)

Part 2: Estimates for the State of Utah

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Gross Product Per Worker	24.3	24.1	24.5	24.8	25.0	24.7	24.8	25.1	25.4	25.8	25.7	25.9	26.3	25.7	26.2	26.8	26.8	25.6
Farms	11.7	13.7	14.0	14.6	13.5	12.5	11.2	12.4	12.0	11.7	14.5	15.7	15.6	17.2	15.2	14.8	16.9	19.5
Ag. Services, Forestry, and Fisheries	13.0	12.8	12.6	12.8	11.9	11.6	10.6	10.7	11.0	11.1	11.0	10.8	11.3	11.7	10.8	11.0	10.4	9.9
Metal Mining	35.4	34.4	36.0	38.7	31.7	32.6	33.3	34.5	30.7	29.5	32.5	33.3	34.7	25.2	35.1	42.0	46.8	54.2
Coal Mining	69.9	59.0	51.6	50.5	57.2	53.0	54.0	60.3	63.3	59.7	59.1	62.5	66.4	66.4	79.3	86.9	91.2	97.8
Oil and Gas Extraction	339.5	328.6	268.8	224.8	245.6	221.2	204.5	201.7	196.4	170.4	137.6	115.8	98.6	82.7	82.4	86.9	91.3	94.3
Nonmetallic Minerals, except Fuels	27.9	29.6	26.2	26.9	28.8	30.9	31.0	38.0	38.8	39.4	41.9	43.8	47.1	40.2	46.9	50.7	51.3	50.5
Construction	38.6	36.1	34.6	34.8	32.5	31.0	30.3	32.3	31.8	29.8	28.3	27.2	25.6	25.3	25.5	24.8	24.1	22.7
Lumber and Wood Products	16.7	19.1	19.8	22.5	20.7	21.1	20.7	20.4	19.1	18.0	18.3	20.2	19.4	17.1	16.4	17.6	17.5	17.4
Furniture and Fixtures	13.0	11.7	12.5	13.1	13.9	14.2	15.9	17.8	17.4	18.9	18.5	16.1	16.9	18.1	19.0	19.6	19.5	19.4
Stone, Clay, and Glass Products	31.8	29.0	31.8	33.6	35.3	31.8	32.3	35.7	34.1	35.5	34.4	32.8	31.5	32.4	35.7	37.6	37.2	37.6
Primary Metal Industries	54.4	50.2	50.0	54.8	57.0	55.6	43.8	41.0	37.6	38.5	38.3	41.3	44.7	43.0	39.6	46.5	50.7	55.1
Fabricated Metal Products	40.4	37.4	36.2	38.7	39.9	35.2	31.3	33.9	34.8	34.0	31.2	31.7	30.5	28.7	30.8	32.9	32.0	32.1
Machinery, except Electrical	23.4	26.0	27.6	30.6	31.6	28.1	30.1	32.8	33.7	35.4	35.0	37.1	42.3	43.8	52.7	63.9	78.6	93.2
Electric and Electronic Equipment	18.3	16.3	18.1	18.4	17.9	15.4	17.2	18.5	22.1	23.3	23.4	24.3	24.9	23.9	25.6	27.2	29.6	30.7
Motor Vehicles and Equipment	32.3	26.6	35.5	39.7	37.5	28.9	32.9	38.6	39.5	42.9	37.3	29.2	37.8	42.4	52.9	55.0	54.9	49.8
Transport Equip. Excl. Motor Vehicles	27.7	30.4	34.5	34.8	35.4	35.2	37.9	36.2	36.4	36.5	35.4	36.1	34.4	34.1	37.5	41.3	42.1	43.4
Instruments and Related Products	21.4	19.5	17.2	13.9	14.9	15.8	17.2	17.8	18.3	18.9	18.0	17.2	18.4	18.8	21.4	24.6	30.7	33.8
Miscellaneous Manufacturing Industries	13.0	12.5	13.1	14.2	13.1	12.6	13.4	14.3	13.8	14.8	13.3	11.6	13.0	12.6	11.6	15.1	17.6	17.5
Food and Kindred Products	15.3	15.6	16.1	17.4	19.2	17.4	18.5	19.2	19.6	19.8	21.1	21.9	22.9	24.4	25.0	24.8	26.4	25.8
Tobacco Manufactures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Textile Mill Products	10.6	9.5	9.6	9.4	8.1	8.7	11.4	24.7	24.4	22.0	23.0	17.9	20.0	10.8	16.5	19.1	19.4	15.6
Apparel and Other Textile Products	7.2	6.8	6.6	7.0	7.6	8.2	8.8	9.2	9.7	10.8	11.8	12.7	13.4	13.4	13.6	12.8	13.1	13.2
Paper and Allied Products	31.9	27.9	31.5	36.2	40.1	33.4	27.6	27.2	25.6	26.6	27.9	27.3	28.1	33.3	37.8	39.3	38.6	41.0
Printing and Publishing	20.0	18.3	18.0	17.8	19.0	19.3	19.8	20.9	21.3	23.0	23.7	23.7	25.3	26.5	26.7	27.1	26.9	24.9
Chemicals and Allied Products	18.5	19.2	21.1	22.5	24.3	21.5	22.2	24.0	26.9	33.9	39.0	40.9	49.7	59.4	68.5	70.2	65.8	69.1
Petroleum and Coal Products	105.3	148.9	170.1	176.8	216.1	129.1	156.5	181.2	174.1	174.3	154.3	145.3	155.2	174.0	217.4	271.9	296.4	315.4
Rubber and Misc. Plastic Products	15.7	15.1	14.0	15.1	18.8	21.0	25.1	25.6	33.8	30.9	29.1	27.4	29.0	24.9	25.8	27.4	29.0	31.8
Leather and Leather Products	13.7	11.6	19.4	19.4	24.7	23.5	13.5	24.1	27.0	15.6	13.9	14.5	18.4	14.6	12.2	14.1	19.2	18.9
Railroad Transportation	47.0	46.5	44.1	47.0	47.5	47.2	43.8	45.1	43.0	46.5	49.1	52.7	53.8	52.2	58.6	60.2	62.3	74.5
Local and Interurban Passenger Transit	24.4	24.0	24.4	24.5	21.8	19.6	21.7	23.7	27.3	28.0	30.3	28.2	26.3	21.1	20.0	18.7	18.2	17.6
Trucking and Warehousing	31.9	31.4	33.7	36.2	36.0	35.2	33.7	36.0	36.6	35.9	34.5	31.7	30.6	29.1	28.8	29.5	27.8	27.6
Water Transportation	0.0	0.0	0.0	0.0	0.0	0.0	11.5	18.0	17.5	13.2	17.8	15.9	16.9	14.0	16.5	0.0	0.0	0.0
Transportation by Air	38.9	41.1	45.0	49.1	50.6	53.9	48.3	53.8	50.1	51.8	48.7	42.4	39.1	39.3	42.8	44.6	39.7	38.3
Pipelines, except Natural Gas	321.4	344.3	338.7	349.2	391.3	343.4	318.2	293.5	300.0	494.6	677.4	738.3	805.6	961.2	964.7	1087.5	1071.4	1132.5
Transportation Services	26.5	25.8	23.0	28.8	29.1	28.6	31.0	29.4	29.7	28.7	28.2	25.8	26.0	24.2	25.9	26.4	25.7	25.4
Communication	34.9	35.7	37.4	39.5	42.1	42.6	44.9	49.2	52.4	53.9	52.6	55.8	59.7	52.3	58.3	61.1	63.7	63.3
Electric, Gas, and Sanitary Services	75.5	75.6	81.6	82.7	90.3	91.4	99.9	96.4	94.2	99.7	101.3	112.0	128.1	126.7	136.1	138.1	135.9	131.0
Wholesale Trade	31.8	32.2	33.6	35.2	35.0	33.6	33.7	33.5	34.6	34.9	33.9	33.1	33.2	33.8	34.6	37.3	39.3	40.1
Retail Trade	14.0	13.9	14.2	14.7	15.0	14.3	14.6	14.9	15.2	15.2	15.3	14.9	14.9	14.6	15.4	15.8	15.8	16.0
Banking and Credit Agencies	26.6	25.8	24.4	23.1	22.1	21.9	21.1	21.4	20.1	21.0	21.1	21.3	22.5	22.8	22.2	22.4	21.4	20.8
All Other Invest. Insur. & Real Estate	73.3	70.3	74.8	75.2	70.4	73.8	80.4	75.8	74.1	78.4	74.7	74.8	68.3	68.0	67.9	65.4	62.7	59.0
Hotels and Other Lodging Places	13.7	14.7	14.2	15.6	13.6	14.0	16.0	16.0	17.1	17.1	17.2	17.2	15.6	16.2	15.3	16.0	13.0	12.4
Personal Services	11.6	11.9	11.9	12.2	12.1	11.9	12.0	11.5	11.7	11.6	11.4	11.3	10.2	10.1	9.8	9.3	9.0	8.8
Business Services	16.2	15.5	15.9	16.0	16.4	17.0	16.1	15.7	16.5	16.9	16.5	16.7	16.3	13.7	14.1	14.4	14.0	13.5
Auto Repair, Services, and Garages	25.2	24.5	25.1	26.1	28.2	27.8	27.1	27.7	27.8	28.8	28.6	28.3	28.1	26.0	26.1	25.3	25.0	24.6
Miscellaneous Repair Services	13.4	12.8	12.6	14.1	13.2	14.5	15.5	14.4	15.3	14.9	15.6	14.9	16.1	17.4	17.0	15.4	15.3	13.3
Motion Pictures	14.9	12.9	15.4	15.8	14.3	12.7	14.6	17.4	18.8	25.3	14.8	12.9	11.0	12.5	11.9	14.9	16.2	13.8
Amusement and Recreation Services	10.7	11.1	11.9	12.2	13.4	11.5	11.2	11.3	11.5	10.8	10.9	10.3	10.9	10.6	10.9	11.1	11.7	11.0
Health Services	22.5	22.7	23.0	20.9	20.5	20.2	20.4	20.8	21.5	20.1	19.9	20.3	20.5	20.1	19.3	19.7	19.3	19.4
Legal Services	41.5	42.4	39.6	38.2	36.7	37.4	36.3	36.3	36.7	35.3	30.7	27.4	27.7	25.5	24.8	23.6	24.4	24.2
Educational Services	7.2	7.3	7.2	7.0	6.9	7.1	8.3	8.3	8.4	8.1	7.8	7.7	7.8	7.9	8.9	9.0	8.4	8.2
Social Services, Membership, & Misc.	15.1	14.9	13.7	13.5	14.7	14.5	14.7	14.6	15.0	16.0	15.6	14.9	16.6	15.6	16.2	16.5	16.8	16.1
Private Households	3.8	3.6	3.4	3.4	3.3	3.2	3.0	3.1	2.9	2.9	2.9	2.8	2.8	2.8	3.0	3.3	3.3	3.4
Federal Civilian Government	27.6	27.3	28.3	24.7	24.5	25.8	25.3	25.2	25.0	25.1	24.7	25.1	25.1	24.5	25.5	26.0	26.2	26.0
Federal Military Government	9.8	9.2	10.3	11.0	10.9	10.4	10.5	11.6	12.3	12.6	12.7	13.2	14.2	14.3	14.2	14.0	13.9	13.9
State and Local Government	15.7	15.6	15.5	15.4	15.2	15.0	15.2	15.7	16.1	16.3	16.7	17.0	17.5	17.8	17.6	17.2	16.9	16.8

Source: Calculated from Unrounded Form of Data in Tables 1 and 2

Table 4

Trends in Constant Dollar Gross Product per Worker
Calculated for Total Economic Activity and for Major Groups and Mining and Manufacturing Sectors

(percent per year)

Part 1

United States and Utah for Periods

	1969-1979		1979-1986	
	U.S.	Utah	U.S.	Utah
Total	[illegible]	0.98	0.72	0.57
Private Industries	[illegible]	0.09	0.57	0.49
Agriculture, Forestry, and Fisheries	[illegible]	0.74	-1.55	-4.51
Mining	[illegible]	0.73	-0.39	4.37
Coal Mining	[illegible]	[illegible]	6.97	7.62
Oil and Gas Extraction	[illegible]	0.15	-3.60	-5.03
Metal Mining	[illegible]	0.58	4.19	7.35
Nonmetallic Minerals, except Fuels	[illegible]	[illegible]	2.14	2.93
Construction	[illegible]	0.36	-1.99	-2.66
Manufacturing	[illegible]	0.33	4.75	6.29
Nondurable Goods	[illegible]	0.51	2.31	4.69
Food and Kindred Products	[illegible]	[illegible]	3.05	3.08
Textile Mill Products	[illegible]	0.00	4.06	0.05
Apparel and Other Textile Products	[illegible]	0.58	1.86	0.99
Paper and Allied Products	[illegible]	0.00	3.84	0.05
Printing and Publishing	0.22	0.53	-0.31	1.41
Chemicals and Allied Products	[illegible]	1.54	3.07	9.01
Petroleum and Coal Products	[illegible]	1.79	1.87	12.47
Tobacco Manufactures	[illegible]	0.00	-2.57	0.05
Rubber and Misc. Plastic Products	[illegible]	1.15	3.79	0.94
Leather and Leather Products	[illegible]	0.00	2.80	0.05
Durable Goods	[illegible]	0.34	5.15	6.85
Lumber and Wood Products	[illegible]	0.86	0.95	-1.70
Furniture and Fixtures	0.45	0.51	0.87	1.49
Primary Metal Industries	[illegible]	0.04	1.29	4.30
Fabricated Metal Products	[illegible]	0.55	2.99	0.66
Machinery, except Electrical	[illegible]	2.54	11.80	14.32
Electric and Electronic Equipment	[illegible]	1.00	4.92	3.82
Transport Equipment Excl. Motor Vehicles	[illegible]	0.41	4.17	3.40
Motor Vehicles and Equipment	[illegible]	1.20	3.22	7.78
Stone, Clay, and Glass Products	[illegible]	[illegible]	2.18	2.22
Instruments and Related Products	[illegible]	1.29	4.00	9.90
Misc. Manufacturing Industries	[illegible]	0.45	6.37	5.22
Transport, Communication, and Utilities	[illegible]	0.12	1.05	2.29
Wholesale Trade	[illegible]	0.27	2.91	2.87
Retail Trade	[illegible]	[illegible]	1.02	1.00
Finance, Insurance, and Real Estate	[illegible]	[illegible]	-1.42	-2.73
Services	[illegible]	0.18	-0.52	-0.99
Government	[illegible]	0.31	0.22	0.26
Federal Civilian Government	[illegible]	0.35	0.04	0.87
Federal Military Government	[illegible]	0.42	0.28	1.07
State and Local Government	[illegible]	[illegible]	0.31	-0.07

Source: Calculated by the BEBR with Ordinary Least Squares on the Natural Logs of Ratios of the BEA-REIS Output and Employment Data

Part 2

Component Sectors Ranked by 1979-1986 Trend in Growth Rate

U.S. 1979-1986		Utah 1979-1986	
Machinery, except Electrical	11.80	Machinery, except Electrical	14.32
Coal Mining	6.97	Petroleum and Coal Products	12.47
Misc. Manufacturing Industries	6.37	Instruments and Related Products	9.90
Electric and Electronic Equipment	4.92	Chemicals and Allied Products	9.01
Metal Mining	4.19	Motor Vehicles and Equipment	7.78
Transport Equip. Excl. Motor Vehicles	4.17	Coal Mining	7.62
Textile Mill Products	4.06	Metal Mining	7.35
Instruments and Related Products	4.00	Misc. Manufacturing Industries	5.22
Paper and Allied Products	3.84	Primary Metal Industries	4.30
Rubber and Misc. Plastic Products	3.79	Electric and Electronic Equipment	3.82
Motor Vehicles and Equipment	3.22	Transport Equip. Excl. Motor Vehicles	3.40
Chemicals and Allied Products	3.07	Food and Kindred Products	3.08
Food and Kindred Products	3.05	Nonmetallic Minerals, except Fuels	2.93
Fabricated Metal Products	2.99	Wholesale Trade	2.87
Wholesale Trade	2.91	Transport, Communication, and Utilities	2.29
Leather and Leather Products	2.80	Stone, Clay, and Glass Products	2.22
Stone, Clay, and Glass Products	2.18	Furniture and Fixtures	1.49
Nonmetallic Minerals, except Fuels	2.14	Printing and Publishing	1.41
Petroleum and Coal Products	1.87	Federal Military Government	1.07
Apparel and Other Textile Products	1.86	Retail Trade	1.00
Primary Metal Industries	1.29	Apparel and Other Textile Products	0.99
Transport, Communication, and Utilities	1.05	Rubber and Misc. Plastic Products	0.94
Retail Trade	1.02	Federal Civilian Government	0.87
Lumber and Wood Products	0.95	Fabricated Metal Products	0.66
Furniture and Fixtures	0.87	Textile Mill Products	0.05
State and Local Government	0.31	Tobacco Manufactures	0.05
Federal Military Government	0.28	Leather and Leather Products	0.05
Federal Civilian Government	0.04	Paper and Allied Products	0.05
Printing and Publishing	-0.31	State and Local Government	-0.07
Services	-0.52	Services	-0.99
Finance, Insurance, and Real Estate	-1.42	Lumber and Wood Products	-1.70
Agriculture, Forestry, and Fisheries	-1.55	Construction	-2.66
Construction	-1.99	Finance, Insurance, and Real Estate	-2.73
Tobacco Manufactures	-2.57	Agriculture, Forestry, and Fisheries	-4.51
Oil and Gas Extraction	-3.60	Oil and Gas Extraction	-5.03

1979-1986 Trends in Gross Product per Worker
U.S. and Utah for Selected Industries

Chart 4
Machinery, except Electrical

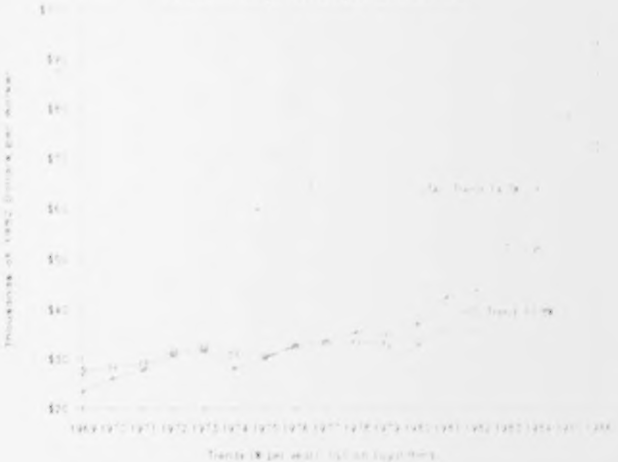


Chart 5
Petroleum and Coal Products

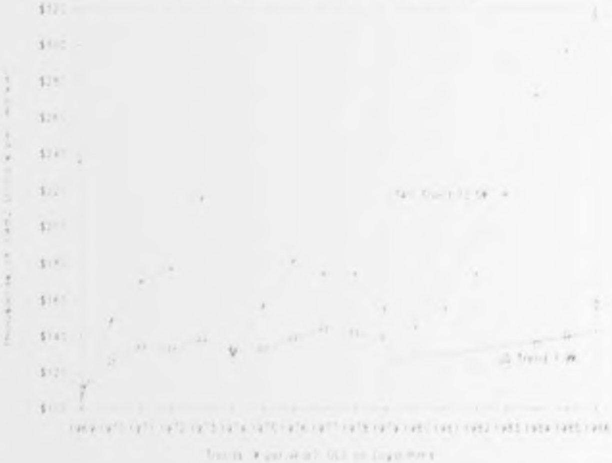


Chart 6
Instruments and Related Products

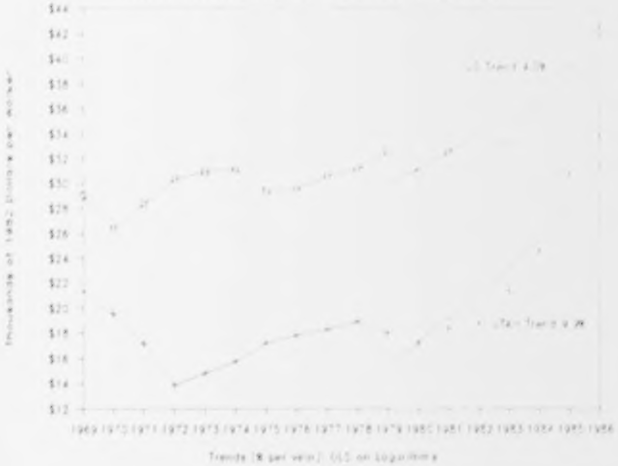


Chart 7
Chemicals and Allied Products

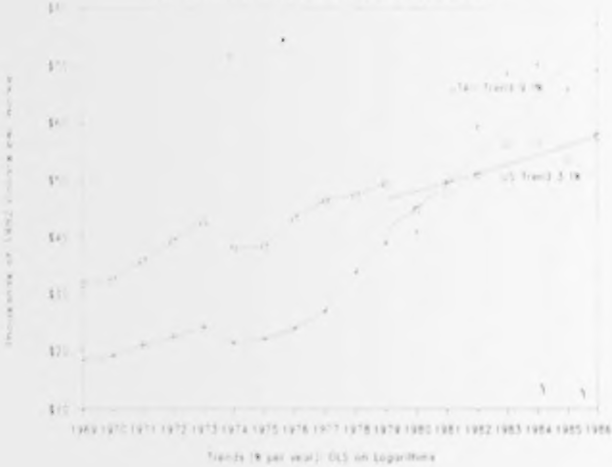


Chart 8
Motor Vehicles and Equipment

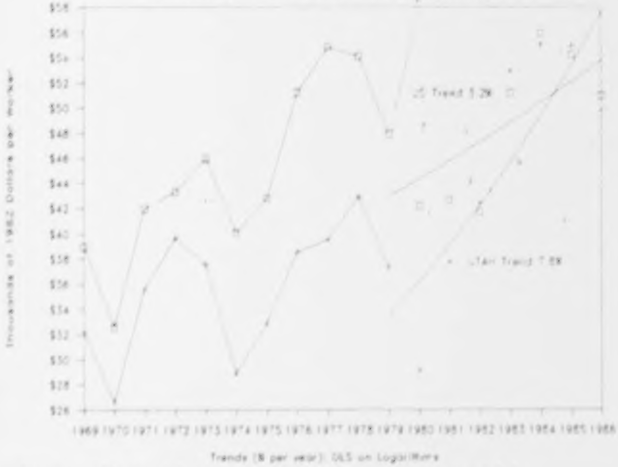
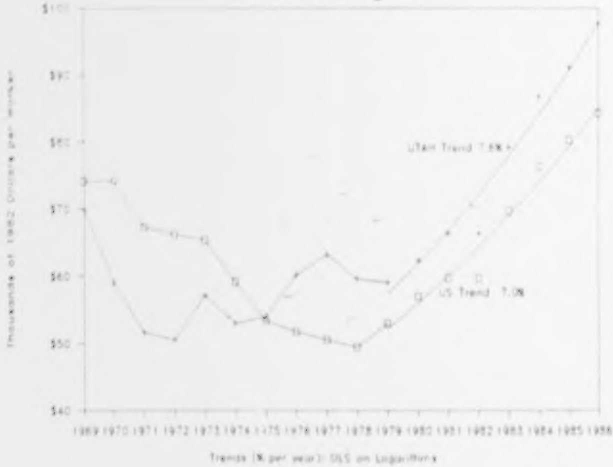


Chart 9
Coal Mining



Source: Derived from data appearing in Tables 3 and 4.

Utah Business Statistics

UTAH DATA	Apr. 1988	Apr. 1989	% Change from Year Ago	12 Month Average This Year	12 Month Average Last Year	12 Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	20,071	NA	NA	NA	19,441	NA
New Corporations (no.)	477	468	-1.9%	450	473	-5.0%
New Car, Truck, and Motor Home Sales (no.)	5,604	NA	NA	NA	5,256	NA
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	70.70	72.90	3.1%	70.08	65.66	6.7%
Lambs (cwt)	61.90	59.60	-3.7%	60.60	71.80	-15.6%
Milk Wholesale (cwt)	11.20	11.40	1.8%	11.78	11.79	-0.1%
Alfalfa Hay, Baled (per ton)	74.00	85.00	14.9%	79.33	70.25	12.9%
Cattle Slaughtered (live weight) (thous. of lbs.)	45,932	43,532	-5.2%	46,757	43,761	6.8%
Construction						
Total Construction (thous. of dol.) 1	72,790.8	86,854.2	19.3%	68,515.4	NA	NA
Residential	36,777.0	39,593.7	7.7%	33,392.4	NA	NA
Nonresidential	23,053.5	30,211.6	31.0%	22,281.0	NA	NA
Additions, Alterations, and Conversions	12,960.3	17,048.9	31.5%	12,842.0	NA	NA
Total Permit Construction (thous. of dol.) 2	86,406.0	94,589.0	9.5%	74,017.8	80,562.7	-8.1%
Residential	36,641.1	44,850.1	22.4%	34,927.8	36,597.8	-4.6%
Nonresidential	33,944.9	32,561.4	-4.1%	25,152.2	30,169.4	-16.6%
Additions, Alterations, and Repairs	15,820.0	17,177.5	8.6%	13,937.7	13,795.5	1.0%
New Dwelling Units (no.)	523	544	4.0%	472	521	-9.4%
Employment						
Civilian Labor Force (thous.)	742.8	766.2	3.2%	761.5	753.4	1.1%
Total Employed Persons	702.2	729.1	3.8%	727.0	709.8	2.4%
Unemployed Persons	40.6	37.1	-8.6%	34.4	43.6	-21.1%
Percent Total Labor Force	5.5	4.8	-12.7%	4.5	5.8	-22.0%
Employees on Nonagricultural Payrolls (thous. of jobs)	651.2	678.0	4.1%	665.9	644.8	3.3%
Manufacturing	96.9	100.7	3.9%	99.3	94.5	5.1%
Mining	8.3	7.6	-8.4%	8.0	8.2	-2.0%
Contract Construction	23.3	23.6	1.3%	24.6	25.5	-3.6%
Transportation, Communication, and Utilities	38.3	39.3	2.6%	39.7	38.1	4.3%
Wholesale Trade	34.5	37.0	7.2%	35.5	34.8	1.8%
Retail Trade	117.4	123.2	4.9%	121.8	118.3	3.0%
Finance, Insurance, and Real Estate	33.1	33.2	0.3%	33.4	33.7	-0.9%
Services 3	154.1	164.4	6.7%	160.2	149.8	7.0%
Federal Government	39.5	40.6	2.8%	39.6	39.5	0.1%
State Government 4	39.5	40.5	2.5%	38.6	38.0	1.4%
Local Government 4	66.3	67.9	2.4%	65.3	64.1	1.8%
Average Weekly Hours						
Manufacturing	40.2	39.3	-2.2%	40.4	40.1	0.9%
Mining	44.5	41.2	-7.4%	41.1	42.3	-2.8%
Wholesale Trade	38.1	36.1	-5.2%	36.8	38.3	-4.0%
Retail Trade	28.5	27.0	-5.3%	27.7	28.2	-1.6%
Amount of Unemployment Compensation (thous. of dol.)	6,272.7	5,164.4	-17.7%	5,399.7	6,753.3	-20.0%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,461.6	2,191.7	-11.0%	2,351.0	2,378.2	-1.1%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	148,704.9	167,403.7	12.6%	149,602.3	144,830.0	3.3%
Sales and Use Tax	11,832.5	19,201.4	62.3%	54,799.2	47,999.6	14.2%
Motor Fuel Tax	8,421.4	9,186.4	9.1%	10,984.5	10,300.4	6.6%
Individual Income Tax	94,881.7	99,278.0	4.6%	52,850.6	53,638.2	-1.5%
Corporation Franchise Tax	17,974.2	23,114.6	28.6%	7,398.9	6,039.3	22.5%
Production						
Crude Oil to Refineries (thous. of bbls.)	4,212.5	NA	NA	NA	3,845.4	NA
Crude Oil (thous. of bbls.)	2,829.1	2,293.4	-18.9%	2,602.9	2,916.6	-10.8%
Natural Gas (mil. of cu. ft.)	22,307.8	21,410.4	-4.0%	22,996.8	22,633.8	1.6%
Coal (thous. short tons)	1,441.0	1,341.0	-6.9%	1,460.6	1,482.6	-1.5%
Tourism/Travel						
Air Passengers (total no. on and off)(S.L. Int'l Airport)	773,179	879,527	13.8%	899,653	912,861	-1.4%
Highway Traffic Count Across State Lines	NA	38,156	NA	NA	NA	NA
Transient Room Taxes (thous. of dol.)	-1,397.8	189.7	-113.6%	595.9	438.0	36.1%
Visits, State, Nat'l. Parks-Monuments (thous.)	941.6	925.2	-1.7%	1,102.3	1,075.9	2.5%
Utilities						
Telephone Lines in Service (Mt. Bell)(Residential)	487,516	498,357	2.2%	492,065	482,750	1.9%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	179,652	185,010	3.0%	182,852	177,516	3.0%
Electric Customers (Residential)	475,965	482,084	1.3%	478,875	474,827	0.9%
Electric Customers (Commercial)	46,561	47,898	2.9%	47,287	46,383	1.9%
Natural Gas Customers (Residential & Commercial)	462,338	473,794	2.5%	463,050	450,706	2.7%
Natural Gas Customers (Industrial)	547	567	3.7%	554	550	0.7%

Utah Business Statistics

UTAH DATA	Apr. 1988	Apr. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	51.3r	53.2f	3.7%	53.0	51.9	2.1%
Unemployment Rate	4.5r	3.7	-17.8%	3.9	5.2	-24.4%
Auth. Permit Construction (thous. of dol.)	17,223.0	11,978.5	-30.5%	8,449.6	9,972.0	-15.3%
New Dwelling Units (no.)	87	76	-12.6%	65	79	-17.1%
Postal Receipts (thous. of dol.)	457.1	488.5	6.9%	477.3	390.6	22.2%
Electric Customers (Residential)	47,935	48,998	2.2%	48,355	47,672	1.4%
Electric Customers (Commercial)	3,403	3,786	11.3%	3,549	3,334	6.5%
Natural Gas Customers (Residential)	50,319	51,777	2.9%	50,907	49,307	3.2%
Natural Gas Customers (Industrial)	52	56	7.7%	54	52	3.0%
Telephone Lines in Service (Mt. Bell)(Residential)	55,130	56,617	2.7%	55,818	54,935	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,218	11,825	5.4%	11,560	10,804	7.0%
Salt Lake County						
Non-Ag. Employment (thous.)	336.6r	348.3f	3.5%	343.5	334.5	2.7%
Unemployment Rate	4.7r	4.3	-8.5%	4.1	5.3	-23.9%
Auth. Permit Construction (thous. of dol.)	43,466.4	33,800.4	-22.2%	32,142.0	36,866.2	-12.8%
New Dwelling Units (no.)	193	195	1.0%	181	189	-4.3%
Postal Receipts (thous. of dol.)	8,172.1	8,744.7	7.0%	8,304.2	7,441.8	11.6%
Electric Customers (Residential)	239,319	242,424	1.3%	240,900	237,494	1.4%
Electric Customers (Commercial)	20,376	20,835	2.3%	20,599	20,108	2.4%
Natural Gas Customers (Residential)	222,700	225,738	1.4%	221,890	218,272	1.7%
Natural Gas Customers (Industrial)	237	241	1.7%	238	236	0.9%
Telephone Lines in Service (Mt. Bell)(Residential)	229,694	234,075	1.9%	231,682	228,007	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,338	112,129	1.6%	111,611	110,185	1.3%
Utah County						
Non-Ag. Employment (thous.)	79.8r	84.5f	5.9%	79.9	76.3	4.8%
Unemployment Rate	4.1r	3.8	-7.3%	3.7	5.9	-36.7%
Auth. Permit Construction (thous. of dol.)	7,060.0	16,592.2	135.0%	11,877.8	11,601.2	2.4%
New Dwelling Units (no.)	58	77	32.8%	69	75	-7.8%
Postal Receipts (thous. of dol.)	1,191.5	1,373.0	15.2%	1,297.0	970.7	33.6%
Electric Customers (Residential)	52,026	52,701	1.3%	52,613	52,542	0.1%
Electric Customers (Commercial)	5,924	5,907	-0.3%	5,995	6,123	-2.1%
Natural Gas Customers (Residential)	62,749	63,711	1.5%	62,145	60,756	2.3%
Natural Gas Customers (Industrial)	68	74	8.8%	70	69	1.8%
Telephone Lines in Service (Mt. Bell)(Residential)	64,695	66,471	2.7%	65,271	63,214	3.3%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,794	21,258	7.4%	20,635	19,219	7.4%
Weber County						
Non-Ag. Employment (thous.)	61.8r	63.8f	3.2%	62.1	60.5	2.6%
Unemployment Rate	5.8r	4.4	-24.1%	4.9	6.9	-28.2%
Auth. Permit Construction (thous. of dol.)	6,119.6	8,803.3	43.9%	5,237.6	7,661.3	-31.6%
New Dwelling Units (no.)	65	77	18.5%	44	61	-27.7%
Postal Receipts (thous. of dol.)	722.7	733.2	1.5%	686.3	624.1	10.0%
Electric Customers (Residential)	53,505	54,240	1.4%	53,778	53,096	1.3%
Electric Customers (Commercial)	4,929	5,056	2.6%	4,963	4,883	1.6%
Natural Gas Customers (Residential)	50,150	50,761	1.2%	50,078	49,202	1.8%
Natural Gas Customers (Industrial)	83	86	3.6%	83	85	-1.8%
Telephone Lines in Service (Mt. Bell)(Residential)	46,383	47,267	1.9%	46,795	46,077	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,785	12,200	3.5%	12,075	11,279	7.1%

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1 Obtained from U.S. Bureau of the Census Construction Statistics Division.
2 Obtained from *Utah Construction Report*.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

NA Not Available
r Revised
f Forecast

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Secretary of State.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, *Utah Agriculture*.
Construction Data	U.S. Bureau of the Census and Bureau of Economic and Business Research, *Utah Construction Report*.
Employment Data	Utah Department of Employment Security.
Savings Information	Utah Savings and Loan Institutions.
Tax Collections	Utah State Tax Commission.
Crude Oil Production	Area Oil Refineries.
Natural Gas Production	Utah Department of Oil, Gas, and Mining.
Coal Production	U.S. Department of Energy.
Air Passengers	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count	Utah Department of Transportation.
Visits to State and National Parks and Monuments	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utah Utility Companies.
Postal Receipts	Postmasters in Davis, Salt Lake, Utah, and Weber Counties.

Bureau of Economic and
Business Research
University of Utah
Salt Lake City, Utah 84
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Permit No. 1529
Salt Lake City, Utah

NATIONAL DATA	Apr. 1988	Apr. 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,818.5	5,194.9	7.4%	5,003.7	4,642.2	7.8%
Total Personal Income (seasonally adjusted) (bil. of dol.)	4,007.1	4,386.5	9.5%	4,188.4	3,870.4	8.2%
Industrial Production Indexes (seasonally adjusted) (1977=100)	135.4	141.6	4.6%	139.3	132.4	5.2%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	426.9	467.5	9.5%	444.4	402.3	10.5%
Net Exports of Goods and Services (bil. of dol.)	-74.9	-52.4	-30.0%	-64.6	-103.5	-37.6%
Exports of Goods and Services (bil. of dol.)	532.5	625.2	17.4%	576.4	482.8	19.4%
Imports of Goods and Services (bil. of dol.)	607.5	677.5	11.5%	641.0	586.3	9.3%
Index of Leading Indicators (1982=100)	141.5	145.6	2.9%	144.2	140.6	2.6%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100):						
CPI-U (All Urban Consumers) All Items	117.1	123.1	5.1%	120.2	115.1	4.4%
CPI-U (All Urban Consumers) Food & Beverages	116.7	124.0	6.3%	120.5	114.7	5.1%
CPI-U (All Urban Consumers) Housing	117.3	121.6	3.7%	119.9	115.6	3.7%
CPI-U (All Urban Consumers) Transportation	107.2	114.6	6.9%	110.5	106.6	3.7%
CPI-U (All Urban Consumers) Medical Care	136.9	146.8	7.2%	141.9	132.8	6.8%
CPI-U (All Urban Consumers) Energy	87.3	94.9	8.7%	90.5	89.3	1.4%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	106.9	113.0	5.7%	109.9	106.0	3.6%
GNP Price Deflator (1982=100) (qtly.)	120.6	126.0	4.5%	123.0	118.5	3.8%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	121.3	123.7	2.0%	122.4	120.5	1.6%
Total Civilian Employment (mil.)	114.7	117.1	2.1%	115.9	113.4	2.2%
Unemployment Rate	5.5	5.3	-3.6%	5.4	5.9	-9.3%
Construction						
Total Construction (mil. of dol.)	22,343.9	21,724.6	-2.8%	20,398.1	21,397.0	-4.7%
Residential	10,679.0	10,998.7	3.0%	9,846.1	9,910.5	-0.6%
Nonresidential	6,905.1	6,509.6	-5.7%	6,891.3	7,593.5	-9.2%
Non-Building	4,759.8	4,216.3	-11.4%	3,660.7	3,915.5	-6.5%
New Dwelling Units (no.)	131,786	126,621	-3.9%	116,159	126,149	-7.9%
Interest Rates						
Federal Funds Rate	6.87	9.84	43.2%	8.51	6.81	25.0%
Short Term (3-month Treasury bill rate)	5.92	8.70	47.0%	7.60	5.90	28.8%
Long Term (30-year Treasury bond yields)	8.91	9.18	3.0%	9.14	8.93	2.4%
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	8.50	11.50	35.3%	10.16	8.54	19.0%
Mortgage Rates (new homes)	8.76	9.88	12.8%	9.08	8.89	2.1%

Sources: *Business Conditions Digest*, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Export/Import Data, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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